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PENNSYLVANIA STATE WATER RESOURCES SUPPLEMENT
to the
U. S. Army Corps of Engineers
"Report for Development of Water Resources in Appalachia"

Submitted to the

Department of the Army
Office of Appalachia Studies
Corps of Engineers

By the

Commonwealth of Pennsylvania
Raymond P. Shafer
Governor

January 1968

Prepared by

The Pennsylvania State Planning Board

As Advisor To
The Secretary of Commerce
The Pennsylvania State Member
on the Appalachian Regional Commission

COMMONWEALTH OF PENNSYLVANIA
DEPARTMENT OF COMMERCE
HARRISBURG

HE SECRETARY

February 15, 1968

John C. H. Lee, Jr.
Colonel, Corps of Engineers
Director, Office of Appalachia Studies
550 Main Street
Cincinnati, Ohio 45201

Dear Colonel Lee:

I am pleased to submit the Commonwealth of Pennsylvania State Supplement to the U. S. Army Corps of Engineers "Report for Development of Water Resources in Appalachia."

This report represents a review of the general development pattern of the Commonwealth and of its water resources requirement within Appalachia Pennsylvania for the immediate and near future. It presents our top priority listing of 17 projects, and those for which further study is requested. In the Appendix there is a listing of all projects submitted for consideration by the Local Development Districts, the several State agencies directly concerned with water resources responsibilities and the U. S. Army Corps of Engineers district offices having jurisdiction within areas of this Commonwealth.

Should further information be required in the course of your consideration of this submittal, please be assured of our cooperation.

Sincerely yours,

Clifford L. Jones

Clifford L. Jones
State Member
Appalachian Regional Commission

Enclosure

COMMONWEALTH OF PENNSYLVANIA
GOVERNOR'S OFFICE
HARRISBURG
17120

ATE PLANNING BOARD

February 9, 1968

Honorable Clifford L. Jones
Secretary
Department of Commerce
416 South Office Building
Harrisburg, Pennsylvania 17120

Dear Secretary Jones:

In accordance with your request of October 18th, 1967, I am pleased to submit the State Supplement to the U. S. Army Corps of Engineers "Report for the Development of Water Resources in Appalachia."

Basically, the report is divided into two major parts. The first deals with the planning background for Appalachia as an important element of project consideration. Although project consideration has been confined essentially to Appalachia Pennsylvania, the scope of planning concern embraces the entire State as well as contiguous areas of the surrounding states having an impact on Pennsylvania's needs. The second part deals with the highest priority projects as presented in the discussion in the text.

This report has the unanimous approval of the Pennsylvania State Planning Board and the department heads of the State agencies directly concerned with the recommended projects.

The preparation of this State Supplement was made possible only because of the diligent cooperation of these departments as well as the most helpful efforts of the seven Pennsylvania Appalachia Local Development Districts and the three district offices of the U. S. Army Corps of Engineers concerned with the Appalachia program in the Commonwealth. To them and to the staff of your department we express our appreciation for the assistance provided and the counsel offered in the preparation of this document and its recommendations.

Sincerely yours,

Irving Hand
Executive Director

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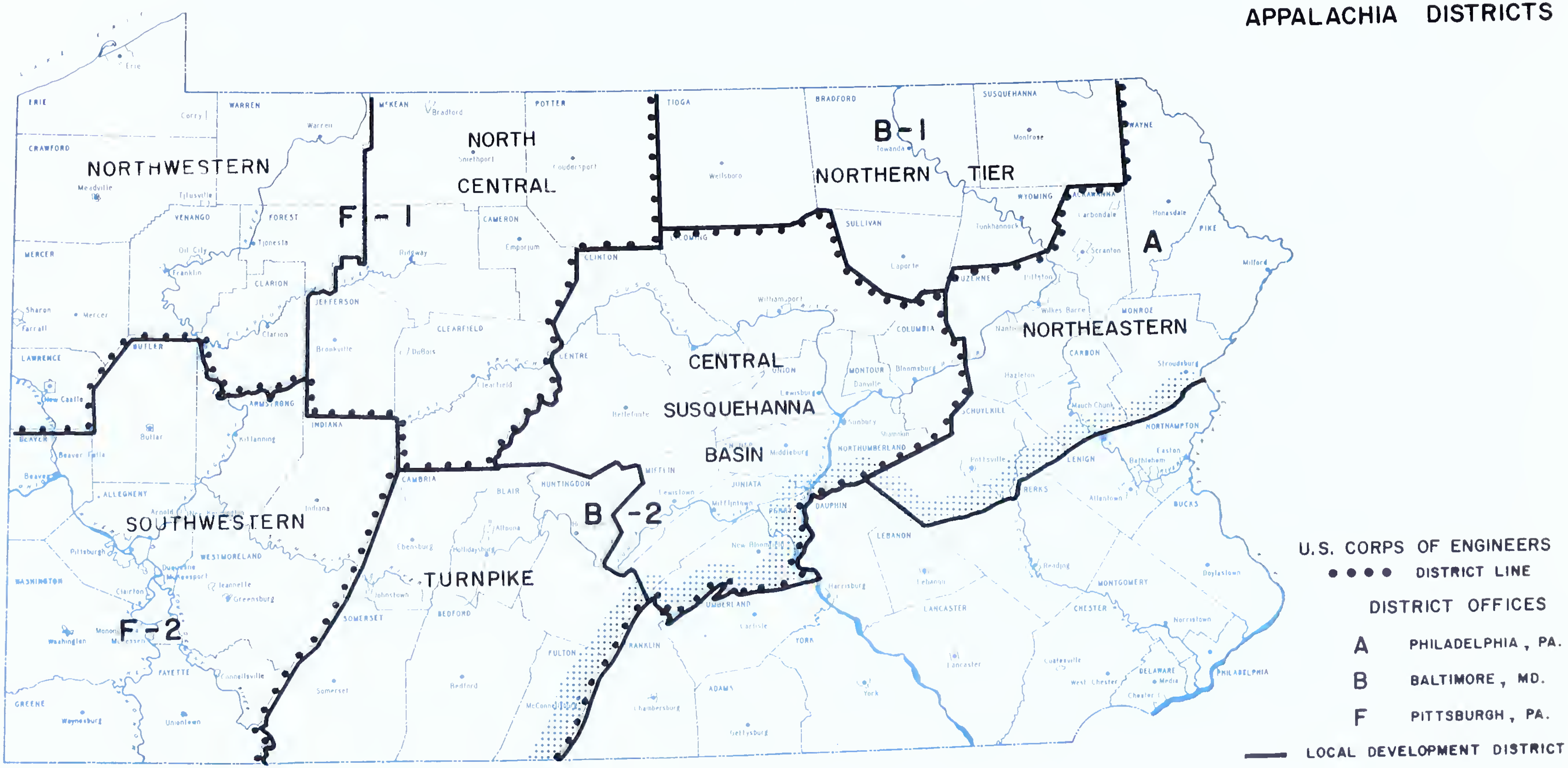
MAP 1

APPALACHIA DISTRICTS



INTRODUCTION

THE ACT AND THE SUPPLEMENT

Under Section 206 of the Appalachian Regional Development Act of 1965, the Secretary of the Army was "authorized and directed to prepare a comprehensive plan for the development and efficient utilization of the water and related resources of the Appalachian region, giving special attention to the need for an increase in the production of economic goods and services within the region as a means of expanding economic opportunities and thus enhancing the welfare of its people."

The Appalachian Act requires that the plan be submitted to the Appalachian Regional Commission for submission to the President who will submit the report, with his recommendations, to the Congress not later than December 31, 1968 (Sec. 206(d), P.L. 89-4).

As conceived and subsequently established, the Appalachian program is a partnership between the Appalachian States and the Federal government. It requires that the States exercise the primary responsibility for recommending projects for consideration by the Commission. Governors of the individual states are primarily responsible for developing investment policies and plans to govern the public investments made in the region under the Appalachian Act.

In the case of this water resources element being prepared under the aegis of the U. S. Army Corps of Engineers, this same goal of state participation was sought. Each of the states in the Appalachian region has been requested to summarize its contribution to the comprehensive plan of the Corps of Engineers in the form of a State

Supplement. In Pennsylvania, the Secretary of Commerce, designated by Governor Shafer as the State Member of the Appalachian Regional Commission, requested the State Planning Board to take responsibility for the actual preparation of the Supplement.

In accepting this responsibility several objectives were agreed upon at the outset. First, the Supplement is to be keyed to the overall purpose of the Appalachian Act with particular reference to the Water Resource Survey (Sec. 206). Second, it is to be harmonious with other Commonwealth development policies and constitute an integral part of the Appalachia Pennsylvania development program and its Plan for Public Investment. Third, programs and projects contributing to the overall development of Appalachia Pennsylvania will be recommended to Corps of Engineers and the Appalachian Regional Commission for consideration; and fourth, a framework for water and related resources planning after 1968 is to be evolved.

Elements to be considered in the Supplement's preparation include requirements for flood control and regulation of rivers to enhance their value as sources of water for industrial and municipal development, generation of hydroelectric power, prevention of pollution, development of recreational possibilities, improvement of navigation where economically required and achievement of soil and water conservation goals.

To assure coordination throughout the thirteen-state Appalachian region, the Corps of Engineers has proceeded with its study during the 1965-67 period and informed each of the State members of the Appalachian Regional Commission of its findings and progress.

In Pennsylvania, supplemental, clarifying details of water planning efforts by state departments and political subdivisions have been supplied. Local Development Districts (see Map 1) have been instrumental in providing local information.

The principles of economic and social development were at the heart of the planning that went into this State Supplement. The first goal was to determine the extent (within each county) water resource problems retard, or might in the future retard, economic growth. Closely related was the second goal of determining how water resource development could alleviate economic problems and provide a stimulus for economic growth.

From this point of view specific information was sought about the economic potential that would be recovered from investments in flood control, pollution abatement or other projects, thus revealing where investments would produce the greatest economic return. Project recommendations were sought both from counties and Local Development Districts and from Commonwealth agencies with water resource development responsibilities.

Finally, a specific goal of the Appalachian water resources planning effort has been to determine how urban centers -- the locations of most economic activity today -- might be economically and socially benefitted by water resources projects.

Economic and social development, the foundation stones of the Appalachian Regional Development Act, have been at the heart of this water resources plan and have been the measure by which needs were evaluated and projects gauged.

CHRONOLOGY

The sequence of events leading to this report are reviewed here to indicate the range of participation and the cooperation that made this Supplement possible.

September 25, 1967 -- Chairman and executive directors from the seven Appalachian Local Development Districts met in Harrisburg with officials of the Pennsylvania Department of Commerce, the State Planning Board and representatives from the Corps of Engineers to be acquainted with the scope of the Water Resources Report and to be familiarized with subjects to be covered in a questionnaire that would be sent to them soon.

September 28th -- Officials from the Corps of Engineers met with staff members of the Department of Commerce and the State Planning Board to discuss the content and scope of the report. The Pennsylvania Supplement, they pointed out, should be completed by mid-January 1968, and to assure good coordination with the Corps of Engineers, they recommended the designation of a specific state agency and individual to be responsible for preparation of the Supplement.

October 6th -- Questionnaires (see Appendix A) were sent to Local Development District representatives who were asked, in cooperation with the counties within each district, to survey each county within their development district and return answers by November 3rd. (Forty-nine of the 52 counties in Appalachia Pennsylvania replied to the questionnaire).

October 18th -- The Secretary of Commerce (State Member, Appalachian Regional Commission) sent a request to the State Planning Board asking that it be responsible for preparation of the State Supplement.

November 2nd -- At the regular meeting of the Water Resources Coordinating Committee of State agencies, members were informed about the scope and timetable of the State Supplement and requested to supply answers to a questionnaire distributed to them (see Appendix B). Replies were requested by December 1st.

November and December -- Meetings were held individually with Commonwealth agency representatives to identify each agency's water resources planning goals, to pinpoint the agency's criteria and standards of evaluation and to review the timetable for preparing the Supplement. During this same period, State Planning Board staff prepared background materials and maps necessary in the planning and evaluation processes.

-- The Water Development Coordinating Committee for Appalachia held a meeting in Knoxville, Tennessee, to brief state officials on the form and content of state supplements. It was attended by the Pennsylvania Water Resources Coordinator, the State Alternate and other Commonwealth officials.

-- An ad hoc committee of officials in state departments concerned with abatement of mine pollution met to find agreement on priorities among several proposed projects. From that meeting a consensus of the most important projects was agreed upon.

December 22nd -- After receiving a progress report from the State Planning Board staff, the Secretary of Commerce decided to call a meeting to discuss proposed project priorities with Cabinet members and directors of State agencies involved in water resources activities.

December 28th -- A special meeting of the State Planning Board was held during which progress on the Supplement was reviewed and approved. The staff was instructed to continue working closely with all agencies involved in water resources planning, and the Board called attention to the need for review of long-range state policy on water resources in Appalachia.

January 3, 1968 -- Executive Directors from the Local Development Districts met with staff members from the State Planning Board and the Departments of Commerce and Forests and Waters to discuss questionnaire replies received from Local Development Districts, Port Authorities and Commonwealth agencies, information received from the Corps of Engineers, the Soil Conservation Service and the Bureau of Outdoor Recreation, and to get reactions to projects proposed by these agencies. General agreement was achieved about the importance of these agency proposals, use of the principles of the Appalachian Regional Development Act as the standard of evaluation, and the State Planning Board staff decision to prepare two lists of water resources projects, the first containing emergency and top priority recommendations, and the second containing all projects submitted by local, state or Federal agencies.

January 4th -- State Planning Board staff presented a report of its work to the Water Resources Coordinating Committee, including a suggested list of top priority projects as received from various Commonwealth agencies. Discussion by the Committee led to unanimous approval of a list of projects.

January 5th -- Secretary of Commerce convened a meeting of Cabinet officials and their principal staff members concerned with water resources activities in the Briefing Room of the State Planning Board. Unanimous agreement was reached on the emergency and high priority projects -- seventeen in all -- which should be included in the State Supplement. Since many of these projects are multi-purpose and therefore affect several agencies at once, this agreement was felt to be most necessary.

February 1st -- State Planning Board staff presented a report to the Water Resources Coordinating Committee, including information on the seventeen emergency and top priority projects.

February 2nd -- A list of projects recommended by the meeting of Cabinet officials was submitted to the State Planning Board for approval. The approved projects and their justifications were incorporated in the report which was transmitted to the Secretary of Commerce for subsequent submission to the Corps of Engineers as the State Supplement.

METHODOLOGY AND ORGANIZATION OF THE SUPPLEMENT

The philosophy of the Appalachian Act and the Commonwealth's objectives for Appalachia controlled the concept underlying the Supplement and the system in its preparations.

The strategy for development of the report included the following essentials:

1. Identification of the general water resources planning goals;

2. Formulation of the special Appalachian Pennsylvania water resources planning objectives;
3. Establishment of criteria to qualify and evaluate projects;
4. Justification of projects for which authorization will be sought as part of the Supplement, and
5. Formulation of a strategy for continuity and coordination of water resources planning.

CREDITS AND RESPONSIBILITY

This Supplement has been prepared by the staff of the Pennsylvania State Planning Board, but it would have been an impossible task without cooperation and assistance received from many people, especially in the following agencies:

State Water Resources Coordinating Committee;

State Departments of:

Agriculture, Commerce, Community Affairs, Forests and Waters, Health, Highways, Internal Affairs -- Geological Survey, Mines and Mineral Industries;

Commissions:

Fish Commission, Game Commission;

Port Authorities:

Erie Port Commission and Port Authority of Allegheny County;

Appalachian Regional Commission;

U. S. Army Corps of Engineers, Office of Appalachian Studies;

U. S. Department of Interior, Bureau of Outdoor Recreation.

SUMMARY OF THE STATE SUPPLEMENT
APPALACHIAN WATER RESOURCES PLAN

1. The Congress directed the Secretary of the Army to prepare a comprehensive plan for the development of water resources in Appalachia. Special attention was to be given to means of expanding economic opportunities and enhancing the welfare of the people within the Appalachian region.

2. This directive (as contained in the Appalachian Regional Development Act of 1965) has been carried out by the U. S. Army Corps of Engineers which has sought information and cooperation of the thirteen states in the Appalachian region.

3. Each state was requested to prepare a "supplement" to the Corps of Engineers report, this supplement to contain views of the states about the most pressing water resource problems and potentials as seen by state and local officials, and to recommend the most needed projects.

4. The Secretary of Commerce, the official designated by Governor Shafer as the State Member for Pennsylvania on the Appalachian Regional Commission,asked the State Planning Board to prepare this Supplement.

5. A review of recent social and economic trends in Appalachia Pennsylvania illustrates a past dependence on heavy industries and agriculture; their economic readjustment reflecting serious employment and population losses.

6. The land of Appalachia is mountainous and drained by three major river systems. Of these, the Susquehanna River and Ohio River are the most important to Appalachia, containing substantial amounts of mine acid and other pollutants at certain points.

7. The Commonwealth of Pennsylvania, in cooperation with the Appalachian Regional Commission, is engaged in comprehensive economic development planning for Appalachia Pennsylvania. In June 1967, A Plan for Public Investment in Appalachia Pennsylvania was prepared, emphasizing new sources of employment, improvement of skills and capabilities of the work force, and upgrading the urban environment.

8. Water resources planning and development is considered to be integral to such economic development.

9. At the same time, water resources planning is subject to a wide range of Commonwealth policies ranging over many subjects such as pollution, water supply, navigation, recreation, and conservation. These policies and economic development goals formed the basis for this Supplement's recommendations.

10. Commonwealth agencies concerned with water resources, and Local Development District and county officials were surveyed for information about needed water resource projects and their expected economic impact. Over 230 projects were received.

11. The resulting list was screened by State Planning Board staff and was discussed with the Commonwealth's Water Resources Coordinating Committee. A final list was agreed upon.

12. Cabinet officials from State agencies concerned with water resources development met in the State Planning Board offices on January 5, 1968 and agreed unanimously to recommend the following seventeen projects:

RECOMMENDED PROJECTS

Emergency Project

A. Lackawanna River and Susquehanna River Mine Drainage Abatement, Subsidence Prevention and Flood Protection

Abatement of mine drainage pollution (pumps, treatment works, land reclamation, and restoration), mine flushing and grouting.

Estimated cost: $68.2 million.

Top Priority Projects

B. Sewickley Creek Watershed -- Flood Protection and Water Supply

Retarding structures on streams and channel improvement to provide floodwater protection and industrial water supply for industries between Greensburg and Youngwood. (P.L. #566 Project)

Estimated cost: $3,528,800.

C. Otocsin Reservoir and Recreation Area

Construction of reservoir in major tourist and recreation area; undertaking of project to be coordinated with City of DuBois by the Department of Forests and Waters.

Estimated cost: $29 million including private investment.
Reservoir public investment $3 million.

D. Sechler's Run Flood Protection

Flood control project on Sechler's Run; to protect industrial and commercial areas of Danville.

Estimated cost: $1,150,000.

E. Clarion River Basin Mine Drainage Abatement

Mine drainage abatement work in the Clarion River Basin, to restore water quality in Clarion River and its major tributaries.

Estimated cost: $60 million.

F. Casselman River Mine Drainage Abatement

1. Abatement of mine drainage to restore fish and aquatic life in the Casselman and Youghiogheny Rivers and to protect the recreational use of Ohiopyle State Park, the first step toward the complete abatement of mine drainage in the Youghiogheny River Basin.

Estimated cost: $5 to 7 million.

2. Further locational and engineering study of the U.S. Army Corps of Engineers, proposed multi-purpose reservoir, Upper Casselman River.

G. Upper West Branch Susquehanna River Mine Drainage Abatement

Corrective work to protect the water quality of the Curwensville Reservoir and a first step towards complete abatement of mine drainage in the West Branch Basin.

Estimated cost: $7.7 million.

H. Connoquenessing Creek Watershed -- Flood Control, Water Supply, Recreation

Flood prevention, water supply and recreation project; to benefit West Central Butler County, including Butler and Zelienople. (P.L. #566 Project)

Estimated cost: $14,637,300.

I. Raccoon Creek Reservoir

U.S. Army Corps of Engineers multi-purpose reservoir, adjacent to Raccoon Creek State Park; flood control, water quality, water supply, recreation.

Estimated cost, including acid stream and strip mine reclamation: $35 million.

J. Port of Erie Dredging

Dredging of West Bay Area and proper disposal of dredged material.

Estimated cost: $2 million.

K. Naturealm Conservation -- Education Area

Development of water-related improvements and facilities at an existing reservoir; to provide a conservation education area.

Estimated cost: $9.5 million.

L. Abrahams Creek Flood Protection

Local flood protection; levee and channel improvements to alleviate flooding of industrial and commercial areas in Wyoming and West Wyoming in Luzerne County.

Estimated cost: $500,000.

State agencies concerned, including the Department of Forests and Waters, Department of Commerce, Department of Health, Department of Highways, Department of Community Affairs, Department of Mines and Mineral Industries, Department of Agriculture, Department of Internal Affairs, Fish Commission and Game Commission. Federal agencies such as the U.S. Army Corps of Engineers, Bureau of Outdoor Recreation and Federal Water Pollution Control Agency will be contacted on a continuing basis.

Relevant to that effort, it is felt that the following projects should receive particular attention:

R. -further study of the construction of a multi-purpose reservoir proposed by the U. S. Army Corps of Engineers, on the Clarion River, near St. Petersburg in Clarion County, including the consideration of the total impact and effect of this reservoir;

S. -study of the proposed reservoir and recreation facility, U.S. Army Corps of Engineers, on Wapwallopen Creek, in Luzerne County;

T. -study of the proposed reservoir and recreation facility, U.S. Army Corps of Engineers, on Meshoppen Creek, in Wyoming County.

APPALACHIA PENNSYLVANIA

Appalachia Pennsylvania covers over three-quarters of the Commonwealth. Commencing at Blue Mountain, the forested mountain ridge that swings across Pennsylvania from the northeast to southwest, Appalachia Pennsylvania extends westward and northward to include the rest of the State. Fifty-two of Pennsylvania's sixty-seven counties and 52 percent of the State's population are found in this region.

Appalachia Pennsylvania suffers in various sections from poor transportation connections, water pollution, spoilation of the countryside, low income, low levels of educational attainment, and unemployment rates higher than the rest of the State. If these conditions continue, Appalachia Pennsylvania will soon have fewer people than Megalopolis Pennsylvania -- the fifteen-county southeastern quarter where most of the State's population growth occurred between 1950 and 1960.

Table 1
Pennsylvania's Population Growth
1950 - 1960

Region	1950	1960	Gain
Appalachia	5,784,652	5,930,784	146,132
Megalopolis	4,713,360	5,388,582	675,222
Pennsylvania	10,498,012	11,319,366	821,354

Source: U.S. Bureau of the Census

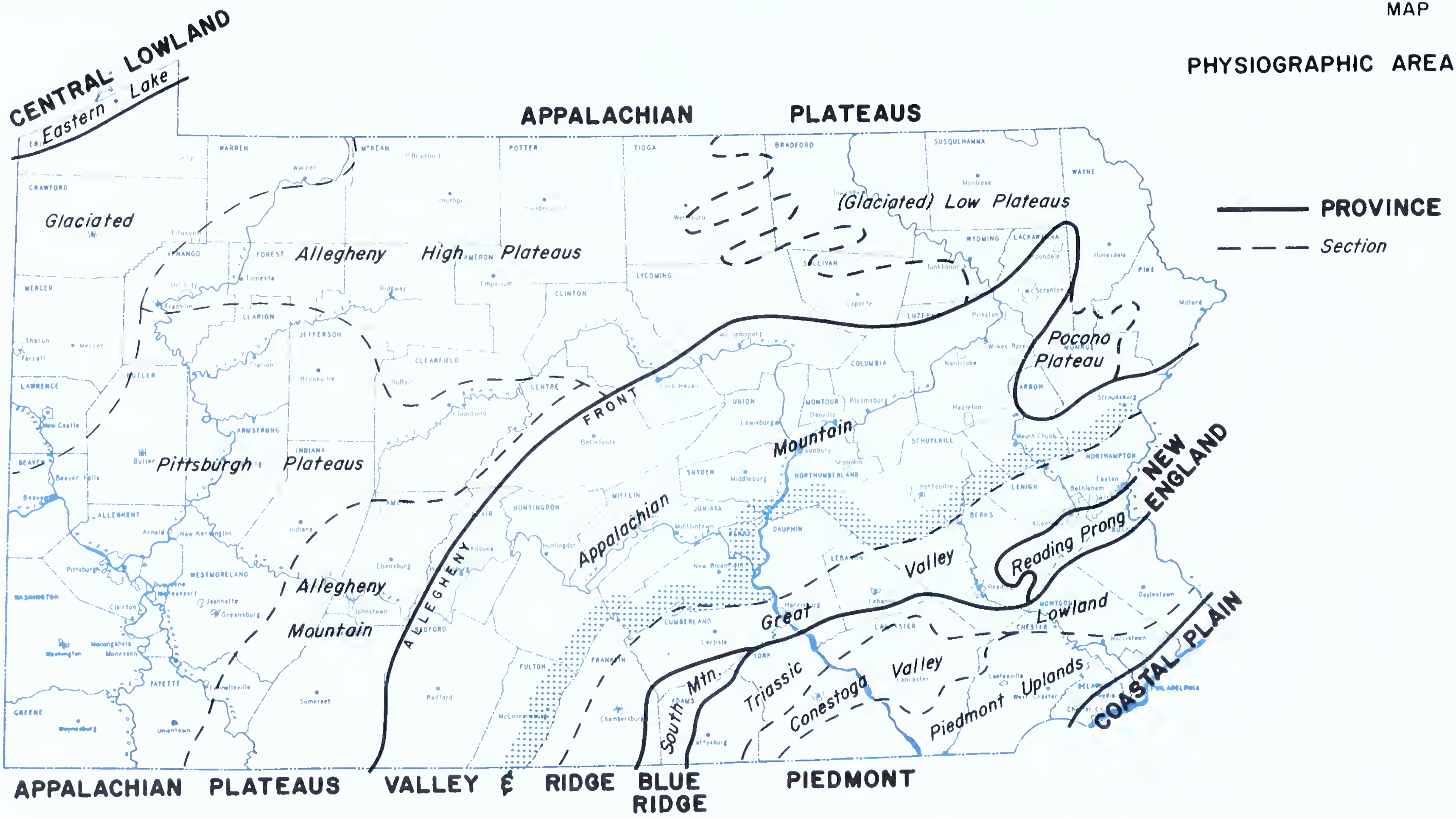
In 1950, Appalachia Pennsylvania and Megalopolis Pennsylvania contained 55% and 45%, respectively, of the total State's population. By 1960, however, Megalopolis Pennsylvania contained 48% of the State's population -- 3% over its share in 1950. During the same period Appalachia Pennsylvania experienced only 18% of the State's population gain. For Appalachia Pennsylvania to achieve its proportion of State growth, its communities must be made more competitive with others in the Nation. New public facilities -- schools, highways, hospitals and the like -- will be needed, but in many cases will be expensive because of the rugged terrain and because of damaging effects of the once flourishing coal mining industry. Still, many investments in people, communities and resources are needed to draw new growth and offset employment losses of mining, railroading and steel manufacturing, traditionally the region's largest employers. If Appalachia Pennsylvania can develop an industrial composition similar to the national mixture, it would then be in a better position to share in the growth of the State and the Nation.

PHYSIOGRAPHIC DESCRIPTION

In spite of the physical and economic problems of Appalachia Pennsylvania, existing resources in the area offer a base for expanded employment. Nature has been good to Pennsylvania. The fertile southeastern Piedmont Plateau and Coastal Plain areas which lie outside Appalachia (see Map 2), are backed up by a vast central region of mountains, forests and rivers dominated by the broad Susquehanna River watershed.

MAP 2

PHYSIOGRAPHIC AREAS



Moving westward, the Appalachian Mountains reach the rugged Appalachian Plateau which has exerted its influence on the region. Major portions of this Plateau are drained by the Ohio, Susquehanna and Delaware watersheds. In many cases urban development, including initial industrial growth, took place in the river valleys resulting in floods in many of these places during periods of high river flows.

Finally, moving farther westward and northward, the Central Lowlands slope to Lake Erie, providing a gateway to the shipping lanes of the Great Lakes and St. Lawrence Seaway.

Rivers

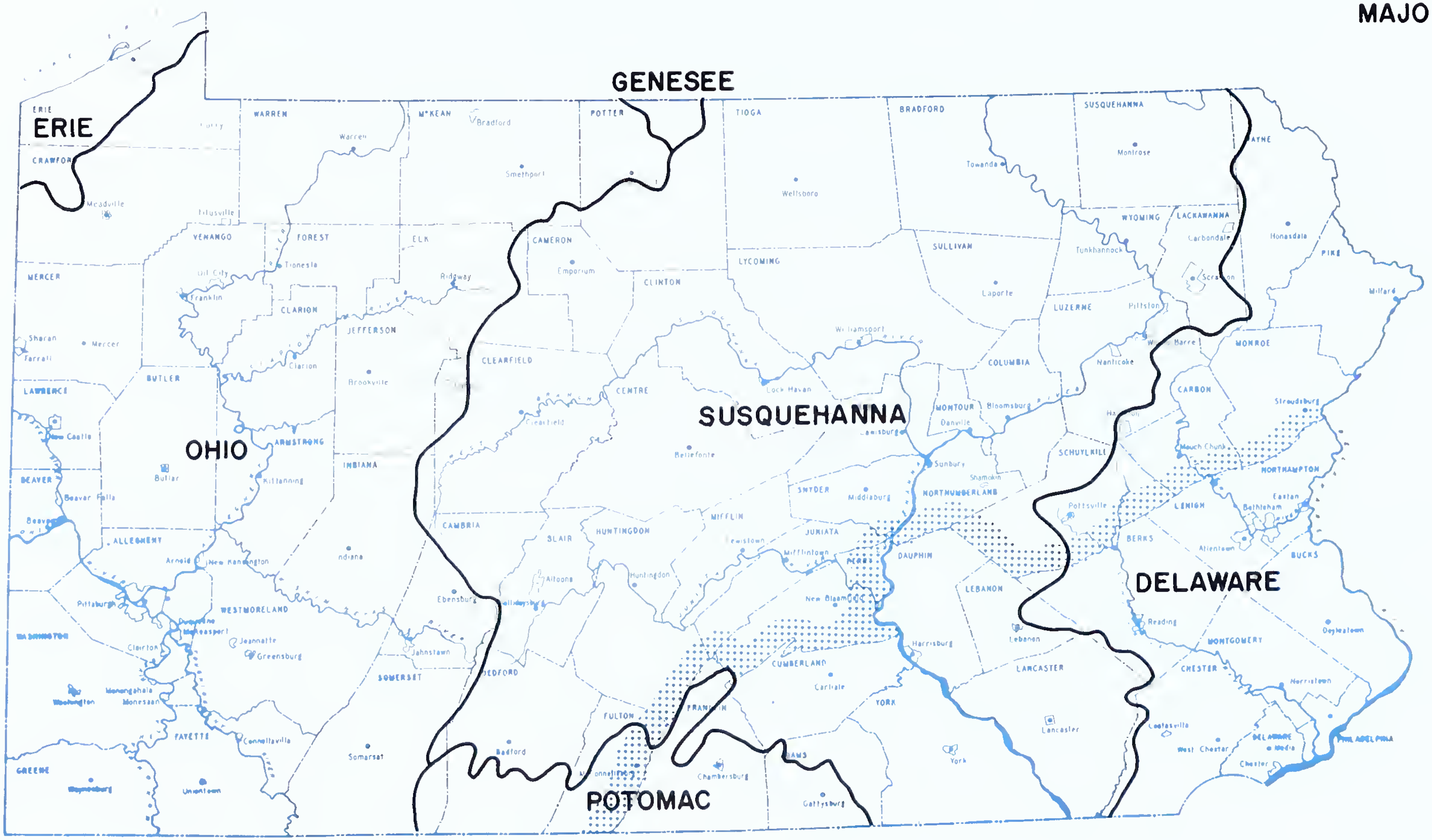
Map 3 shows the watersheds of Appalachia Pennsylvania. The three major river basins, from east to west, which pass through Appalachia are the Delaware, Susquehanna and Ohio. The Potomac and Genesee river basins and Lake Erie watershed cover smaller portions of Appalachia Pennsylvania. These watersheds represent a heritage of water resource developments and offer the opportunity to improve Appalachia Pennsylvania economically and socially -- in terms of new employment, new income, and a more pleasant working and living environment.

The Delaware River extends from the Catskills in New York State to the Atlantic Ocean, draining a long, narrow basin 40 to 80 miles wide. It has cut a deep gorge through the Catskills and the Appalachian Plateaus Province in New York State and then flows down broad Appalachian valleys. At Delaware Water Gap it pierces nearly vertical sandstone walls and passes on through scenic farm and forest land. For 150 miles -- from Hancock, New York, to the Delaware State Line -- it forms the eastern boundary of Pennsylvania, and within the State it drains 6,442 square miles, approximately a third of which is within Appalachia. The Delaware River Basin Commission (DRBC) has been established to oversee the comprehensive development of the basin's water resources, and of particular intent to the Delaware River Basin Commission is the Tocks Island Reservoir and the surrounding Delaware Water Gap National Recreation Area. These projects are expected to spur the tourist business of Monroe and Pike Counties which are at the eastern edge of Appalachia Pennsylvania. At least three additional major water control projects in the Commission's plan for development also lie in Appalachian counties of Pennsylvania as do numerous smaller projects.

Along the main stem of the Delaware, the problems and potentials are different from those along the Lehigh and Schuylkill, which are tributaries of the Delaware and have suffered from municipal and industrial pollution. Much of this pollution occurs after the streams break through Blue Mountain, leaving Appalachian counties to the north, although significant pollution from anthracite mining occurs around their headwaters in Schuylkill and Carbon Counties. On the main stem of the Delaware, the water quality is remarkably high north of Easton and is therefore sought by eastern seaboard cities whose increasing demands require them to search far and wide for new supplies. In part, the inevitable competition of New York, New Jersey and Pennsylvania cities brought about the

MAP 3

MAJOR DRAINAGE BASINS



Delaware River Basin Commission whose responsibility it is to regulate use of basin's water supplies, clean up existing sources of pollution and develop the abundant recreation and economic resources of the river basin.

The Susquehanna is the longest river draining into the Atlantic Ocean,rising in Ostego Lake in central New York. It dips into the north portion of Susquehanna County (Pennsylvania), and back into New York before it finally bends southward through Bradford County. It flows to the southeast through the Allegheny Plateau and breaks into the Ridge and Valley province of the Newer Appalachian Mountains at Pittston where it is joined by the Lackawanna River from the northeast. From there, following a longitudinal valley, it moves southwesterly to Sunbury where it is joined by the 228 mile long West Branch which rises in the Appalachian Plateau country of northern Indiana County. From Sunbury, it flows south until it is joined by the Juniata River flowing from the west through the Ridge and Valley province. Just below this confluence it cuts through Blue Mountain near Harrisburg and emerges in an impressive mile-wide bed that moves southeasterly to the Chesapeake Bay and on to the Atlantic Ocean.

During the 1825-40 canal era of Pennsylvania, the Susquehanna and its tributaries were the routes of canals from Harrisburg west across the mountains along the Juniata, north and west along the West Branch of the Susquehanna to Lock Haven in Clinton County, and northeast to Wilkes-Barre and on up to Towanda in Bradford County. Along the Juniata, iron was produced in charcoal fired furnaces; to the north along the West Branch, lumbering was the principal industry; and along the Wyoming Valley, traversed by the North Branch, anthracite mining was the dominant industry for over a hundred years.

The legacy of anthracite mining in the deep mines of the Lackawanna and Wyoming Valleys from Carbondale to Nanticoke is a yearly contribution of acid mine water. As mines have been abandoned they have filled with ground water ultimately overflowing into adjacent mines or into the Susquehanna and its tributaries. Pumping waters from these abandoned pools was necessary to continue operations in some active mines and resulted in serious pollution in 1961. By 1966, it was reported in the Susquehanna River Basin Report Mineral Industry Water Requirements and Waste Water that the four anthracite fields contribute 1,088,100 tons of"sulfuric acid equivalent", 103,800 tons of iron, and 11,900 tons of manganese to the Susquehanna River system annually. A report from the Division of Sanitary Engineering of the Pennsylvania Department of Health revealed that between 1940 and 1960 "although there has been no significant change in the volume of mine drainage entering the river from the Wyoming region, the amount of acid entering the river has more than doubled."

The West Branch of the Susquehanna is also beset with acid drainage -- this from bituminous mining operations occurring around its headwaters in Cambria, Indiana, Centre and Clearfield Counties. The West Branch above Lock Haven has a 3,337 square mile watershed containing at least 4,351 active and abandoned mines. These discharge 1,959 tons of "sulfuric acid equivalent" into the river daily. At Lock Haven the acid water of the West Branch is joined by the alkaline flow of Bald Eagle Creek bringing about a neutralizing balance so that below this point, the river is usually non-acid and contains aquatic life, including fish.

Fish kills occur, unfortunately, when rain storms in the upper reaches of the West Branch increase the acid flow in proportion to the volume of alkaline water coming from Bald Eagle Creek and other downstream tributaries. Damage to fish and other aquatic life from these "acid slugs" often extends downstream to Williamsport and occasionally as far down as Sunbury.

The headwaters of the Tioga River, a tributary of the North Branch which drains parts of Tioga and Potter Counties, are also contaminated by bituminous mine drainage. The pollution extends about 20 miles downstream before natural river flows dilute and neutralize it.

On the Juniata a few small tributary streams on the Raystown and Frankstown branches are polluted. Five hundred and forty-six active and abandoned mines have been spotted on these two tributaries, and they contribute 112 tons of sulfuric acid equivalent to the river system daily.

The Ohio River Basin in Pennsylvania covers 15,600 square miles of the western part of the State and is comprised of three major tributaries -- the Allegheny, Monongahela and Beaver Rivers.

The Allegheny rises in Potter County, turns northward into western New York State before flowing in a southwesterly direction in a deep v-shaped bed through the Appalachian Plateau to Pittsburgh. There it joins the Monongahela (which flows from West Virginia) to form the Ohio River. About 25 miles downstream from Pittsburgh, the Ohio is joined by the Beaver River which drains a 3,100 square mile section of eastern Ohio and Northwestern Pennsylvania.

The Allegheny River contains generally good quality water in its upper reaches although oil production in Warren and Venango Counties has led to pollution by brines and other oil field wastes. Farther downstream mine acid pollution from the Kiskiminetas River (fed by the Conemaugh and Little Conemaugh Rivers, Loyalhanna and Blacklick Creeks) is a major source of the Allegheny's pollution and has caused numerous fish kills below Freeport. Upstream from the Kiskiminetas other tributaries made acid by drainage resulting from bituminous mining activity are Crooked, Cowanshannock, Mahoning and Red Bank Creeks and the Clarion River. The latter also has organic pollution caused by wastes from tanneries and a paper mill.

The Allegheny is navigable into northern Armstrong County 72 miles above Pittsburgh although river traffic (5 million tons in 1964) is confined largely to movement of coal and sand and gravel. Both navigation and flood control works have been constructed along it to reduce the ravages of floods and protect life and property located along the narrow valley beside it. The worst flood occurred in March 1936, and although total protection from such floods is probably not economically feasible, reservoirs on East Branch Clarion, Tionesta Creek, Mahoning Creek, Crooked Creek, the Conemaugh River and Loyalhanna Creek effectively control 24 percent of the drainage. The just completed Allegheny Reservoir above Warren and the planned Muddy Creek, Union City and Woodcock Creek Reservoirs in the French Creek Basin will control an additional 21 percent of the Allegheny's drainage.

The Monongahela is formed by the confluence of the West Fork and Tygart Rivers at Fairmont, West Virginia, from which it flows northward 120 miles to Pittsburgh, draining 2,730 square miles in Pennsylvania. As with the Allegheny, it carves a deep valley through the Appalachian Plateaus province, an area of rugged terrain with deep, narrow valleys and few flat places save those in flood plains, occasional terraces and flat-topped hills.

The Monongahela is navigable throughout its length, plus two miles up the Tygart River at Fairmont, West Virginia, and its traffic (37.5 million tons in 1964) is comprised mostly of coal and coke.

As with the Allegheny, the worst flood on the Monongahela occurred in March 1936, and were it not for construction of control works since then, a similar flood today would cause an estimated $69.5 million in damage and inundate 13,000 acres. Now, reservoirs on the Youghiogheny and Tygart Rivers control 22 percent of the drainage. Several projects are in various stages of planning to bring a larger portion of the basin's waters under control.

Because it drains bituminous coal fields that have been mined for over a century, the Monongahela has the dubious distinction of being the most acid of all the twenty-two sub-basins in the Ohio River system. Most of this acidity comes from small tributary streams joining the Monongahela between Fairmont, West Virginia and Pittsburgh. (Within this area only an estimated one-tenth of the coal reserves have yet been mined). Although mine drainage is the most serious problem, organic wastes are also significant throughout this industrial valley.

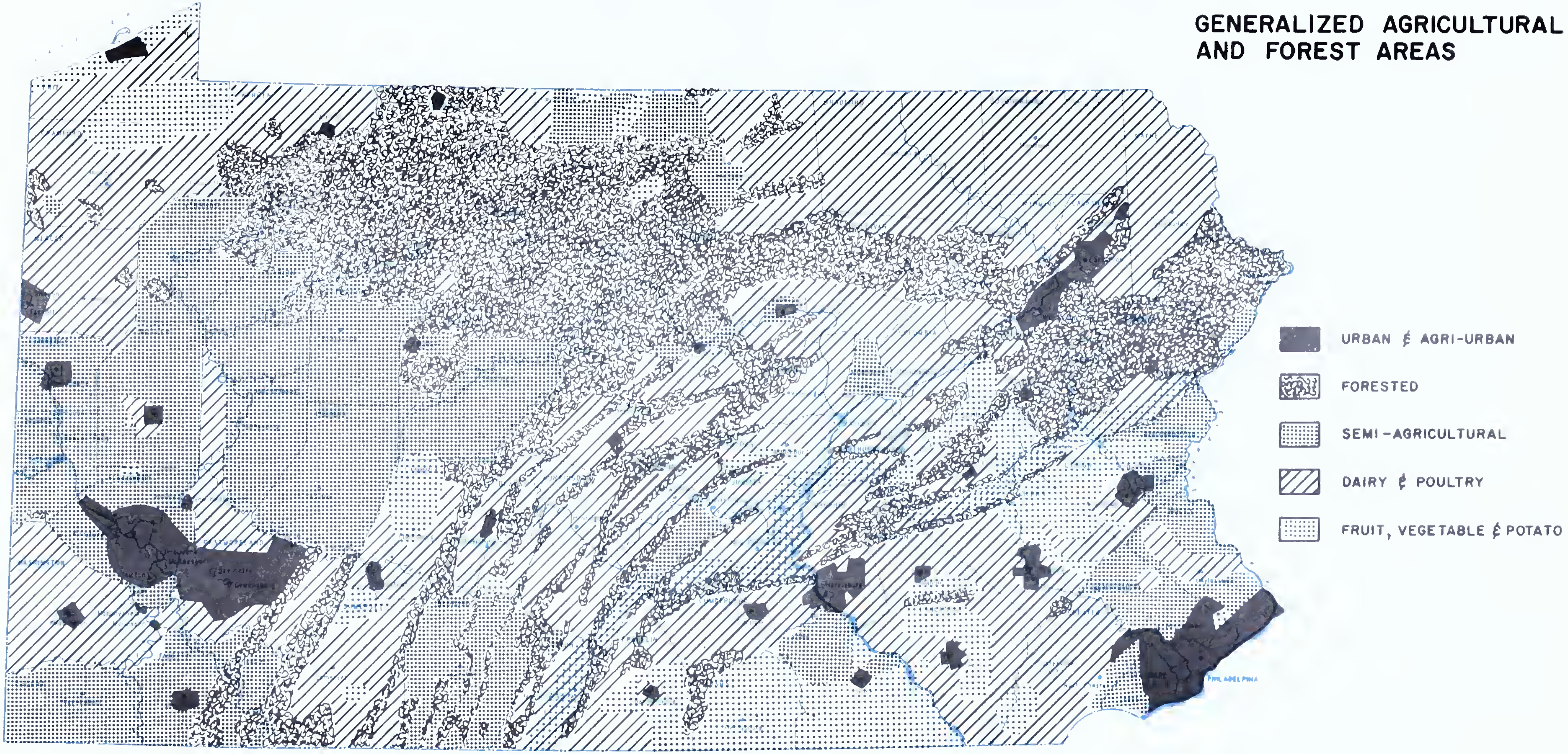
The Beaver River is smaller than either the Allegheny or Monongahela and is not navigable. It is formed near New Castle where the Shenango and Mahoning Rivers converge. The Mahoning rises in Ohio and passes Youngstown in a southeasterly direction while the Shenango rises in northwestern Pennsylvania and flows to the Ohio border before turning to the south. It traverses Appalachian Plateau country much of which has been transformed by continental ice sheets which rounded hills and filled valleys with glacial sediments.

Reservoirs on both branches have been constructed which, together with others in the planning stages, will control a third of the drainage. Two important flood problems exist at Youngstown, Ohio, and at New Castle and will require channel improvements.

The waters in their natural state are primarily hard and changes in chemical composition result from domestic and industrial wastes which keep the river slightly acid. Industrial discharges often cause thermal pollution by returning heated water to the stream

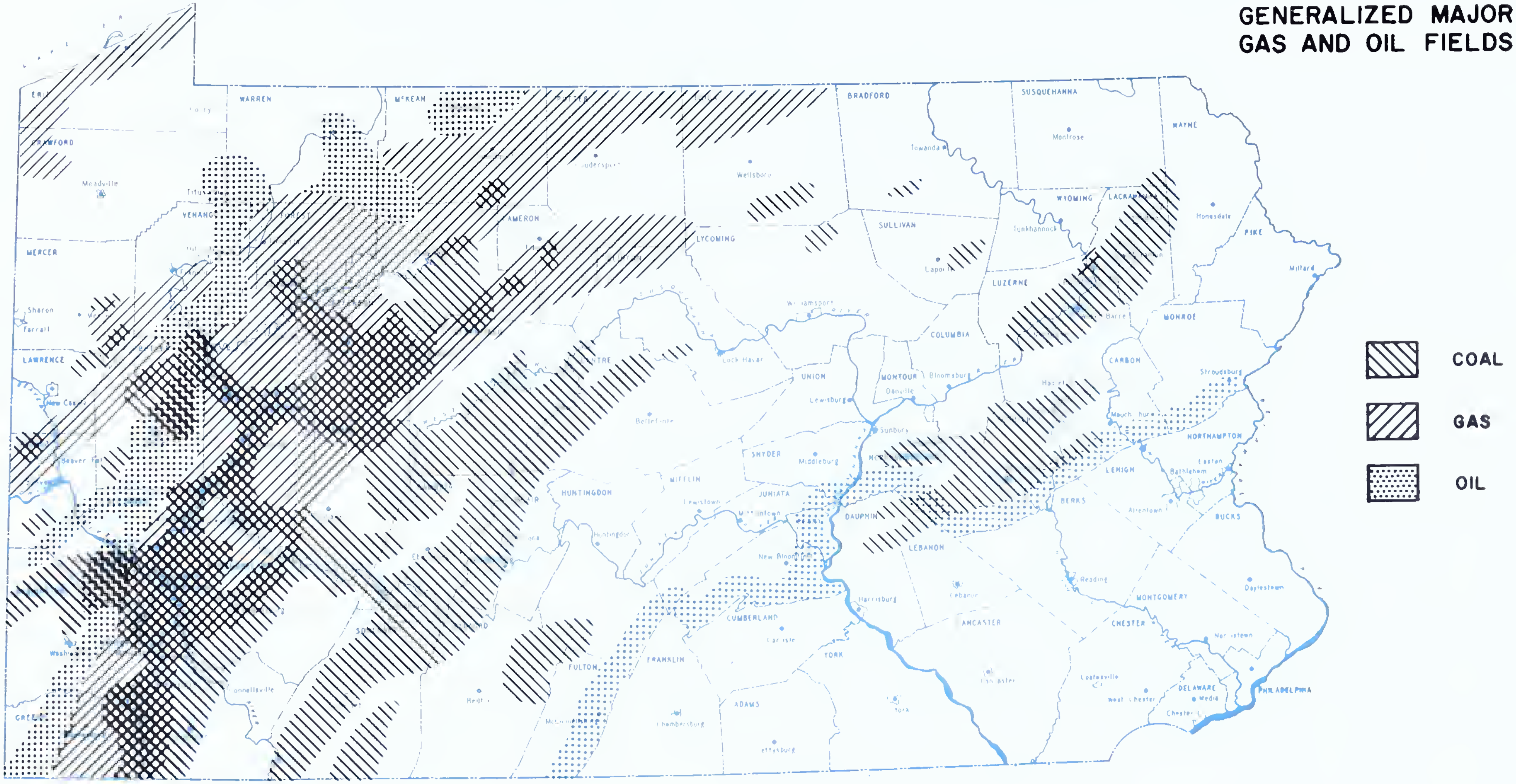
MAP 4

GENERALIZED AGRICULTURAL AND FOREST AREAS



MAP 5

GENERALIZED MAJOR COAL, GAS AND OIL FIELDS



mining prospered. The evidence has been found in the State's rivers and streams. Now there is an awareness by business and the public that balanced development of minerals and water resources is a necessity for economic progress.

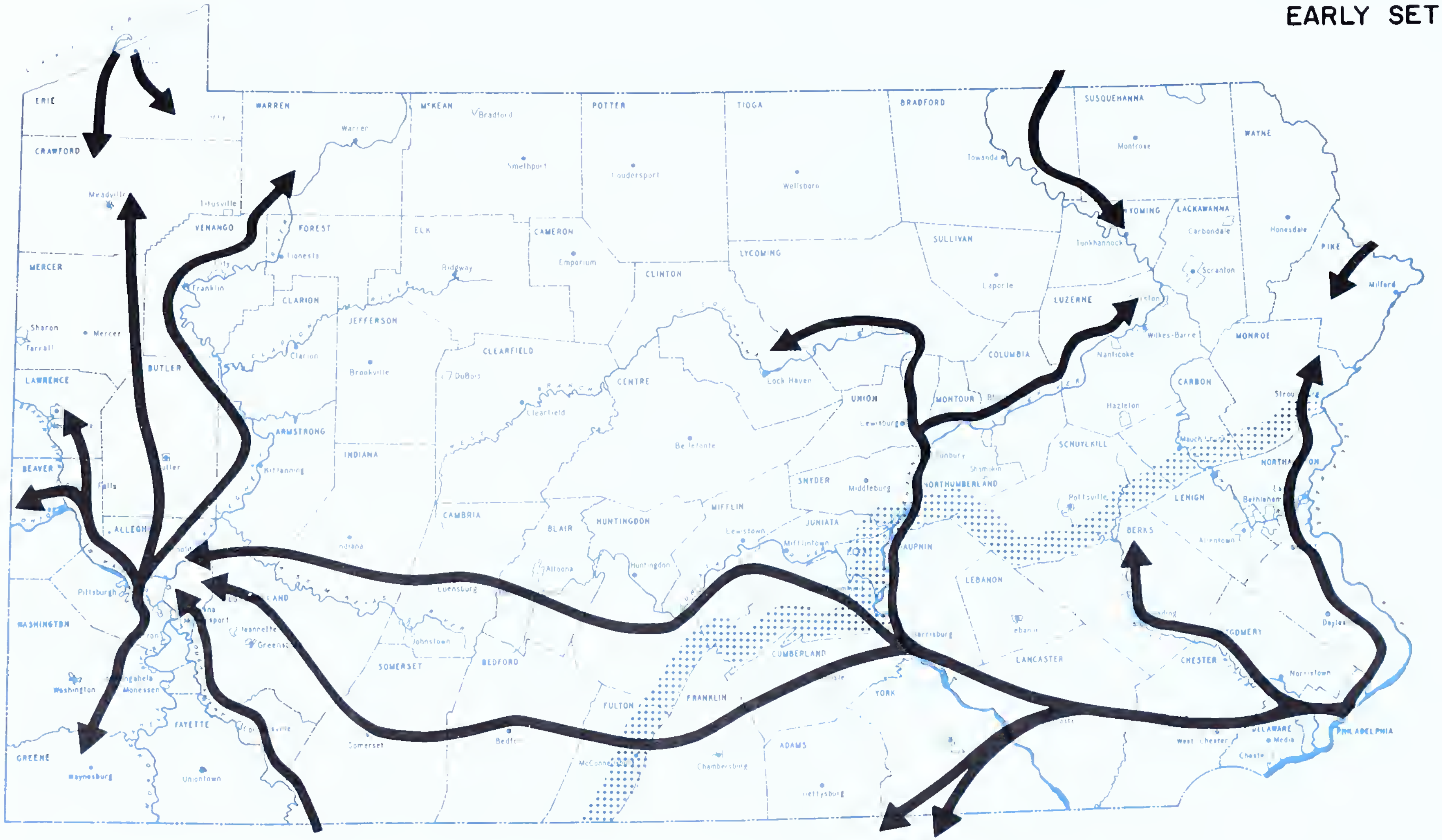
SOCIO-ECONOMIC PROFILE

As stated previously, poor access to much of Appalachia Pennsylvania has contributed toward its slow growth. Some parts, of course, were served by early roads. Map 6 shows diagrammatically the early trade and travel routes which later canals, railroads and highways followed. Due to the rugged terrain of central Pennsylvania, it was much easier to reach Western Pennsylvania from Philadelphia by swinging south from Lancaster to the Cumberland Trail to Pittsburgh instead of crossing the mountains. It was, therefore, quite natural that western Pennsylvania would initially be influenced by a predominance of settlers and traders from Virginia and Maryland. Similarly, the northern tier counties, (Tioga, Bradford and Susquehanna) were partially settled by New Englanders that found easier access into this portion of the State from the north than did the Philadelphians from the south. The Dutch from their settlement at New Amsterdam (New York) were able to penetrate far enough into the Poconos Mountain area of Pennsylvania to leave a legacy of Dutch named streams or "Kills" that serve as a reminder of their once prominent position here.

As shown on Maps 7 and 8 Appalachia Corridors -- high-speed highways -- are planned that will improve highway access throughout

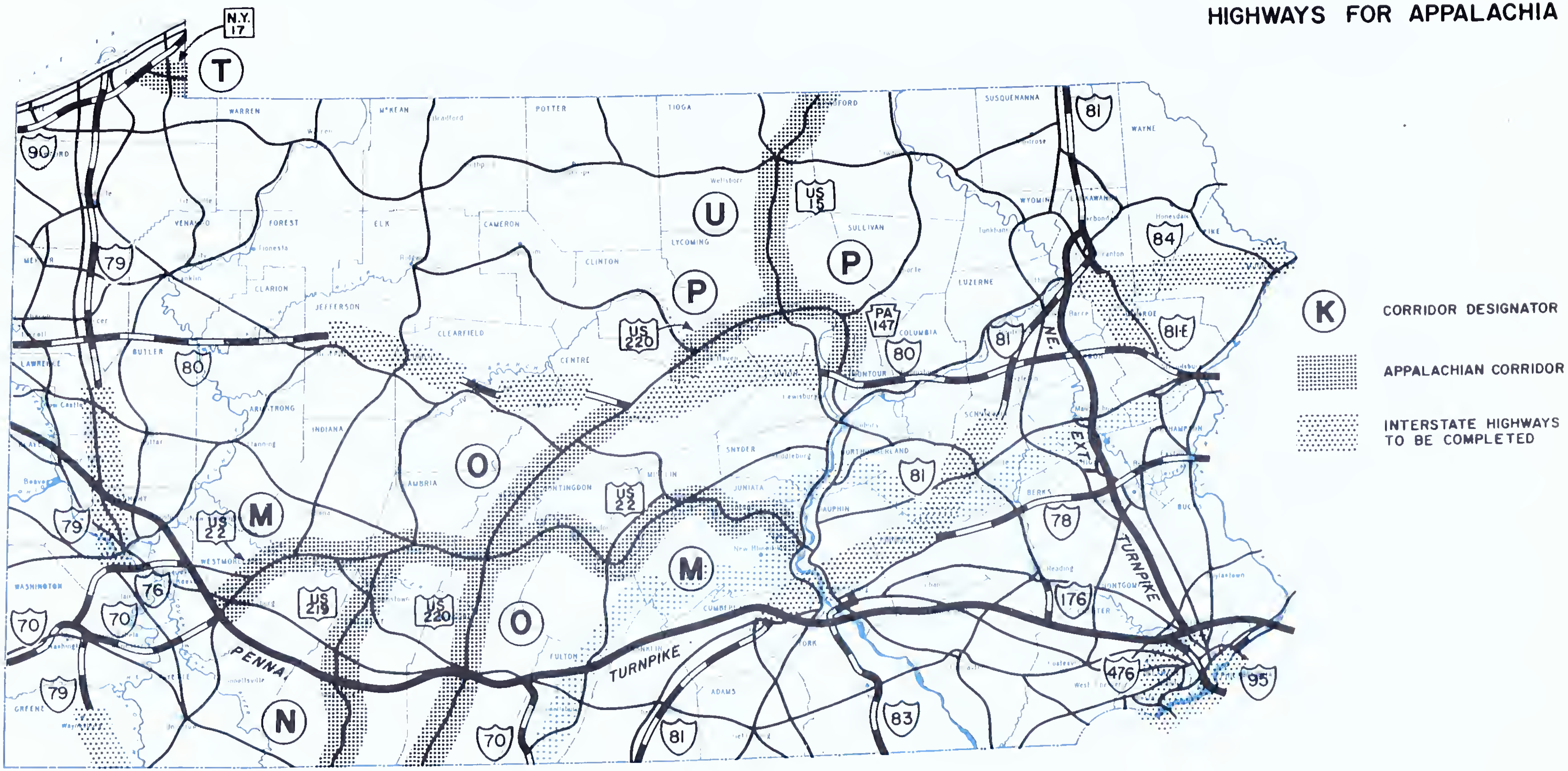
MAP 6

EARLY SETTLEMENT PATTERN



MAP 7

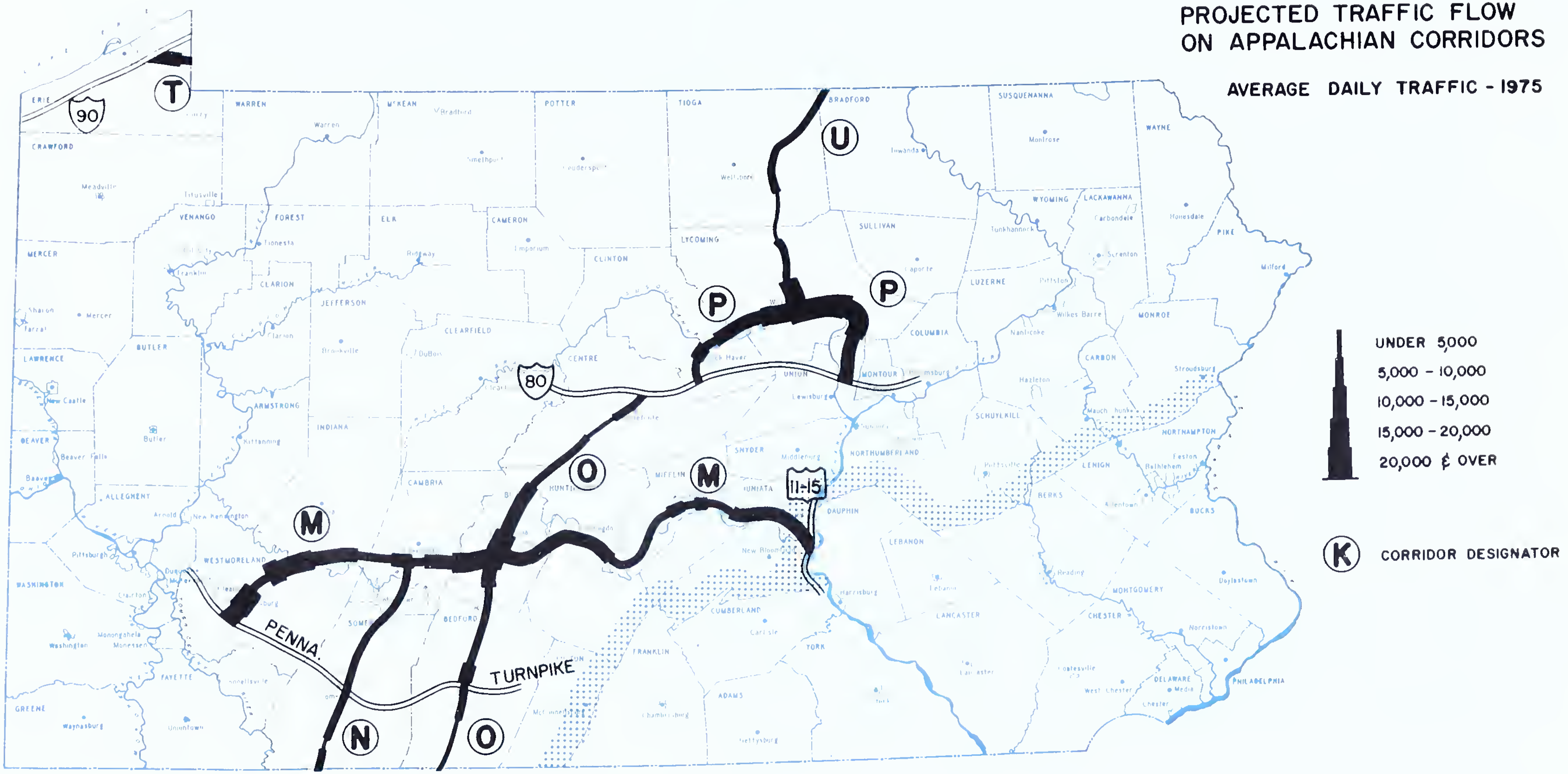
HIGHWAYS FOR APPALACHIA



MAP 8

PROJECTED TRAFFIC FLOW ON APPALACHIAN CORRIDORS

AVERAGE DAILY TRAFFIC - 1975



Appalachia. These will be of particular benefit to Johnstown, Altoona and Williamsport, urban centers in the center of Appalachia Pennsylvania which have been bypassed by transportation improvements in the recent past. Scranton and Wilkes-Barre enjoy excellent access to the urban centers around them, due to planned and constructed interstate highways. As additional highways are completed, a large portion of Appalachia will be served by high-speed limited-access roads. When all Appalachia corridors and interstate highways are completed, persons living in most Appalachia counties will be able to drive to one of the interstate highways in a half hour or less time.

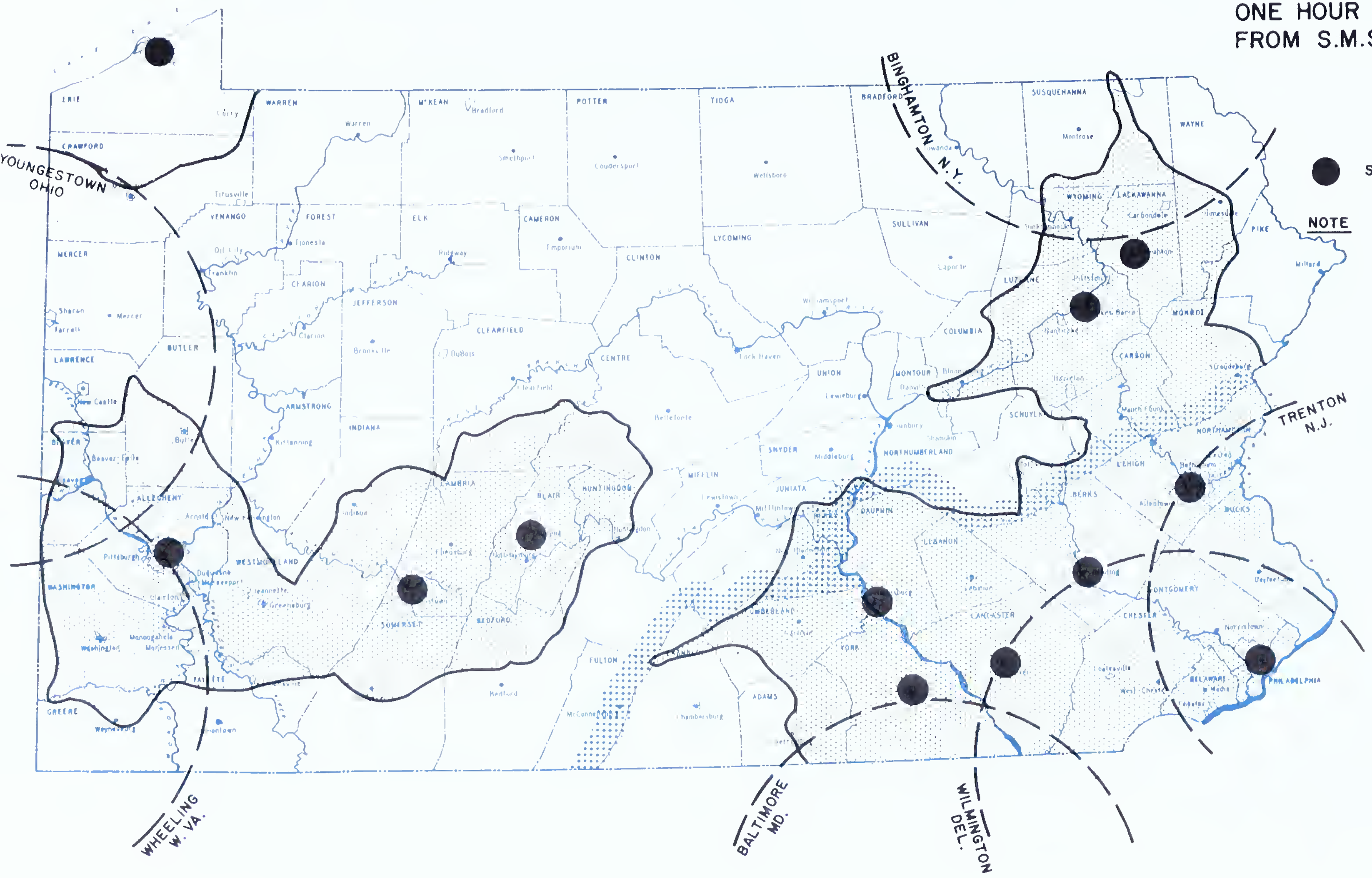
Map 9 presents another view of access within the State. It shows the distance an auto can travel within one hour on various roads from central cities of the State's twelve metropolitan centers. The primary assumption of this analysis is that most persons will not travel more than one hour's driving distance to go to work or to reach intensively developed recreation areas. Also shown on this Map are the one-hour travel time radii centered on Binghamton, New York; Youngstown, Ohio; Wheeling, West Virginia; Trenton, New Jersey; Baltimore, Maryland; and Wilmington, Delaware, metropolitan centers that extend into Pennsylvania.

The configurations produced by the one-hour driving distances from each of the twelve centers produce an overall pattern for the State as a whole, indicating the areas where employees can live and still find employment within one of the central cities if they are willing to spend a relatively short time for commuting. In addition, the five metropolitan centers which lie beyond the State's borders also play a significant role, since these "near neighbors" may seek water-oriented economic investments and recreational opportunities in Pennsylvania within an hour's driving time. Considering the overall pattern shown on May 9, it can be seen that one strong east-west corridor of one hour's commuting distance develops from Philadelphia to Pittsburgh, and two others are found, having a north-south orientation, in the eastern and western ends of the State.

On Map 10, the 1960 State's population distribution is plotted(by local political subdivision boundaries) and shows densities of 300 to over 1000 persons per square mile. It highlights the three major urban complexes of Appalachia Pennsylvania -- Pittsburgh, Scranton-Wilkes-Barre and Erie. The largest, the Pittsburgh urban belt, extends from Fayette County through Beaver County, to connect with the Youngstown urban area. This urban area constitutes an important part of the steel manufacturing belt which extends all the way to Lake Erie in Ohio. Next in size is the urban concentration found in northeastern Appalachia Pennsylvania -- the Wilkes-Barre-Scranton area, characterized by the urbanization along the Wyoming and Lackawanna Valleys, where anthracite coal was once extensively mined. A third major area is found along the waterfront around Erie, extending from the Ohio to New York State lines.

MAP 9

ONE HOUR DRIVING DISTANCE FROM S.M.S.A. CENTRAL CITIES



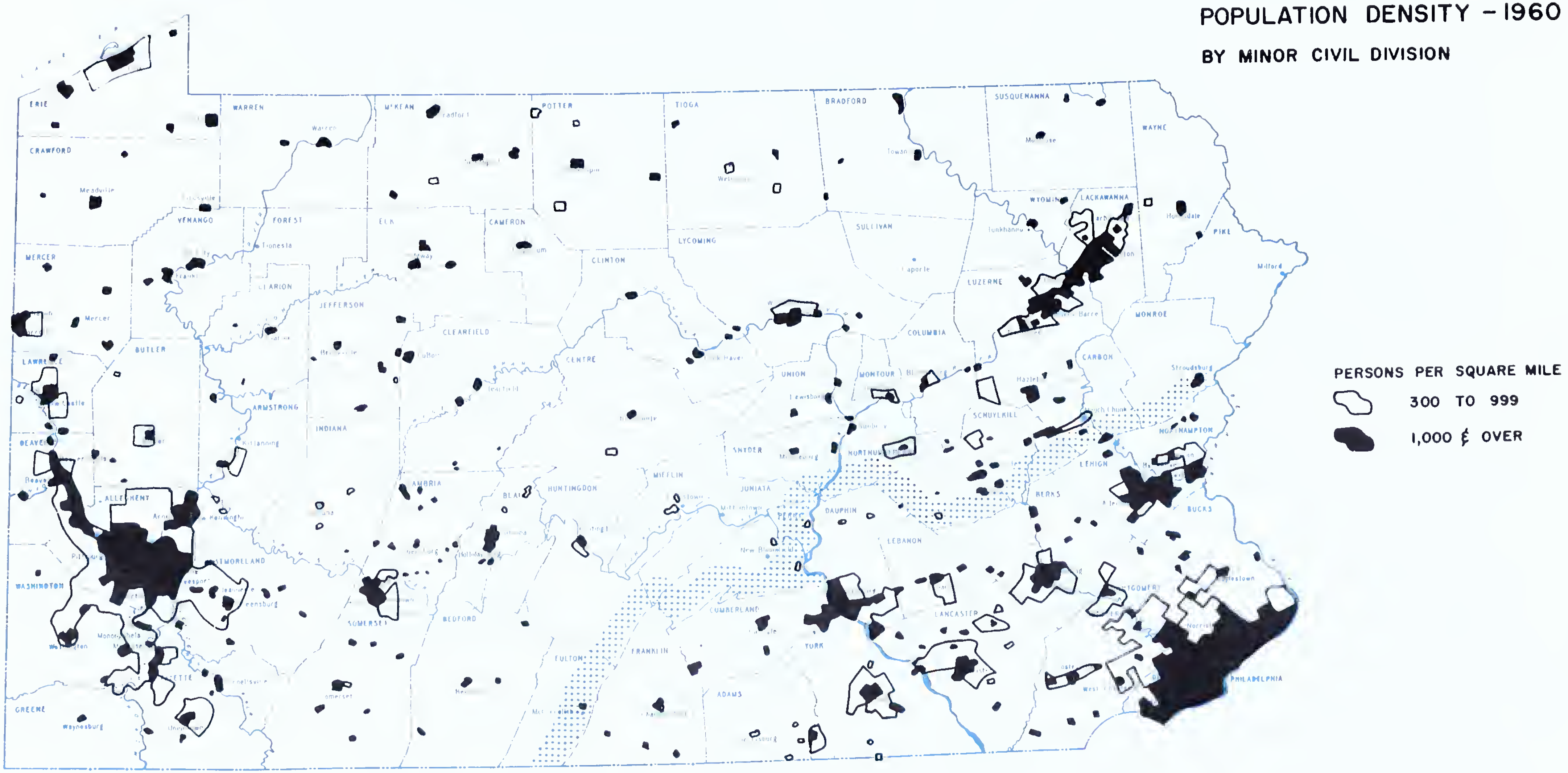
● S.M.S.A CENTERS

NOTE DISTANCE TRAVELED BASED ON:
LIMITED ACCESS HIGHWAYS AS 60 M.P.H., ALL OTHER HIGHWAYS AS 30 M.P.H.

MAP 10

POPULATION DENSITY – 1960

BY MINOR CIVIL DIVISION



Though smaller than the above-mentioned complexes, Altoona and Johnstown are significant urban centers and are classified as standard metropolitan statistical areas. They are located in Blair and Cambria Counties, respectively. Williamsport in Lycoming County is northeast of Altoona. To the west, the New Castle and Sharon-Farrell urban areas form links in the Pittsburgh-Youngstown urban belt. Throughout the remaining sparsely developed central Pennsylvania area, widely dispersed small towns and cities predominate.

Map 10 emphasizes the fact that Pennsylvania is a highly urbanized State. The 1960 Census places the State of Pennsylvania as the seventh most densely populated State in the Nation. In short, Pennsylvania is a highly urbanized industrial State. The concentration of population in different sections of Appalachia influences the nature and location of water resources development needs and the selection of projects to meet these needs.

Of importance too in selecting projects for water resources development is the identification of the location of Appalachia Pennsylvania's employment centers. Map 11 shows manufacturing employment centers providing 500 to over 4000 jobs (by political subdivision). These employment centers deserve prime consideration in pollution abatement, flood control, and other water resources projects, pertinent to the needs of existing or prospective businesses.

Area employment growth also serves as a guide for investment in those areas which already show growth potential. Taken as a whole, Appalachia Pennsylvania experienced a growth of 139,100 jobs between 1960 and 1966, while its unemployment rate dropped from 10% to 4%. Assuming an unemployment level of approximately 3% as signifying full employment, it will be observed from Table 2 that adjustments must be made (either by continuing out-migration, the creation of new jobs or both) to achieve this standard in the Southwestern, Turnpike, North Central and Northern Tier Local Development Districts. As viewed on Table 2, each of the Appalachia Local Development Districts of Pennsylvania experienced a decline in unemployment between 1960 and 1966. At the same time, the Southwestern, Turnpike, North Central, and Northeastern Districts experienced a decline in total civilian work force as well. These civilian work force declines, of course, contributed toward the reduction in unemployment rates as shown on Table 2. All of the Districts showed extensive net out-migration between 1960 and 1965 with the greatest out-migration occurring in the Southwestern District. The population trends for each of the Districts (shown on Table 3) reflect partial adjustments in net migration and District population change from 1960 to 1965. Even though they experienced some net out-migration, the Central Susquehanna Basin and Northwestern Districts increased in total population, making them the only Districts in Appalachia Pennsylvania that grew during this period.

The preceding discussion has centered on absolute employment and population figures and comparison of Appalachia Pennsylvania and its Local Development Districts with the rest of the State. Another method of examining the gains or losses of development

MANUFACTURING EMPLOYMENT – 1965

BY MINOR CIVIL DIVISION

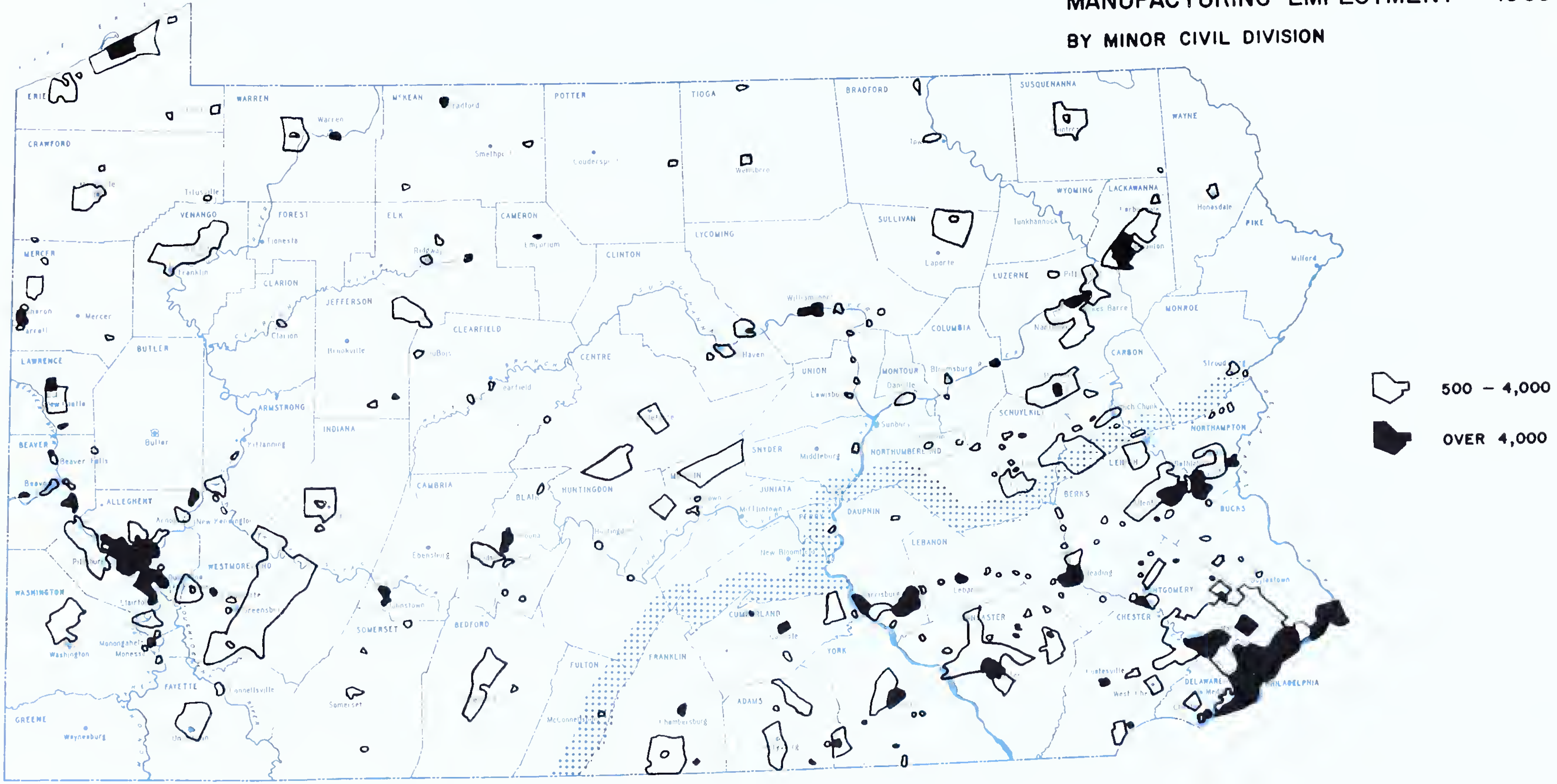


TABLE 2
EMPLOYMENT - WORK FORCE TRENDS 1960-1966

District	Civilian Work Force (thousands) 1960	Civilian Work Force (thousands) 1966	Total Employment (thousands) 1960	Total Employment (thousands) 1966	Total Unemployment (thousands) 1960	Total Unemployment (thousands) 1966	Unemployment Rate (percent) 1960	Unemployment Rate (percent) 1966
Northwestern	254.9	266.6	232.0	258.8	22.9	7.8	9.3%	2.9%
Southwestern	1,094.2	1,077.8	990.9	1,043.6	103.3	34.2	9.4%	3.2%
Turnpike	175.7	173.9	155.1	164.5	20.6	9.4	11.7%	5.4%
North Central	93.4	92.3	84.4	88.5	9.0	3.8	9.6%	4.1%
Northern Tier	49.7	50.9	45.3	49.0	4.4	1.9	8.9%	3.7%
Northeastern	352.1	347.3	310.1	331.0	32.0	10.3	9.1%	3.0%
Central Susquehanna Basin	196.0	212.6	180.5	206.0	14.5	6.6	7.4%	3.1%
Appalachia Total	2,233.2	2,233.4	2,014.0	2,153.1	219.2	80.3	9.8%	3.6%

Source: Pennsylvania Department of Labor and Industry, Bureau of Employment Security, April 1967.

TABLE 3
LOCAL DEVELOPMENT DISTRICT POPULATION TRENDS
1960 - 1965

District	Actual Population 1960 (1)	Estimated Population 1965 (2)	Population Change 1960-1965	Net Migration 1960-1965 (2)	District Population Percentage Change 1960-1965	Population Shift 1960-1965
Northwestern	721,892	726,100	4,208	- 31,289	0.6	24.0%
Southwestern	2,883,728	2,840,300	-43,428	-173,728	-1.5	-95.4%
Turnpike	510,508	503,400	- 7,108	- 26,749	-1.4	- 4.6%
North Central	244,240	241,800	- 2,440	- 14,757	-1.0	- 0.4%
Northern Tier	147,740	144,800	- 2,940	- 10,797	-2.0	- 4.2%
Northeastern	884,381	883,100	- 1,281	- 15,744	-0.2	21.9%
Central Susquehanna Basin	538,293	557,500	19,207	- 8,871	3.6	49.5%
Total Appalachia Pennsylvania	5,930,782	5,897,000	-31,220	-281,935	-0.6	±100.0

Sources:
(1) 1960 Census of Population
(2) State Planning Board Staff Working Paper, Population Estimate 1965, Pennsylvania Counties, December 1967.

districts in Appalachia Pennsylvania, relative to the development districts among themselves or Appalachia Pennsylvania as a whole, is the "shift" (see Map 12). The shift technique compares the observed change in a development district or county to the change that would have occurred if each area under study changed at exactly the same rate observed in 1960-1965 for Appalachia Pennsylvania as a whole; the latter is called the expected change. The shift for each Local Development District or county is the differential between the observed change and expected change. Some Districts and counties performed better than Appalachia Pennsylvania as a whole and vice versa; hence, the total of positive and negative percent shifts equal each other. The shift, in effect, compares the change of an individual area with the change of the area as a whole.

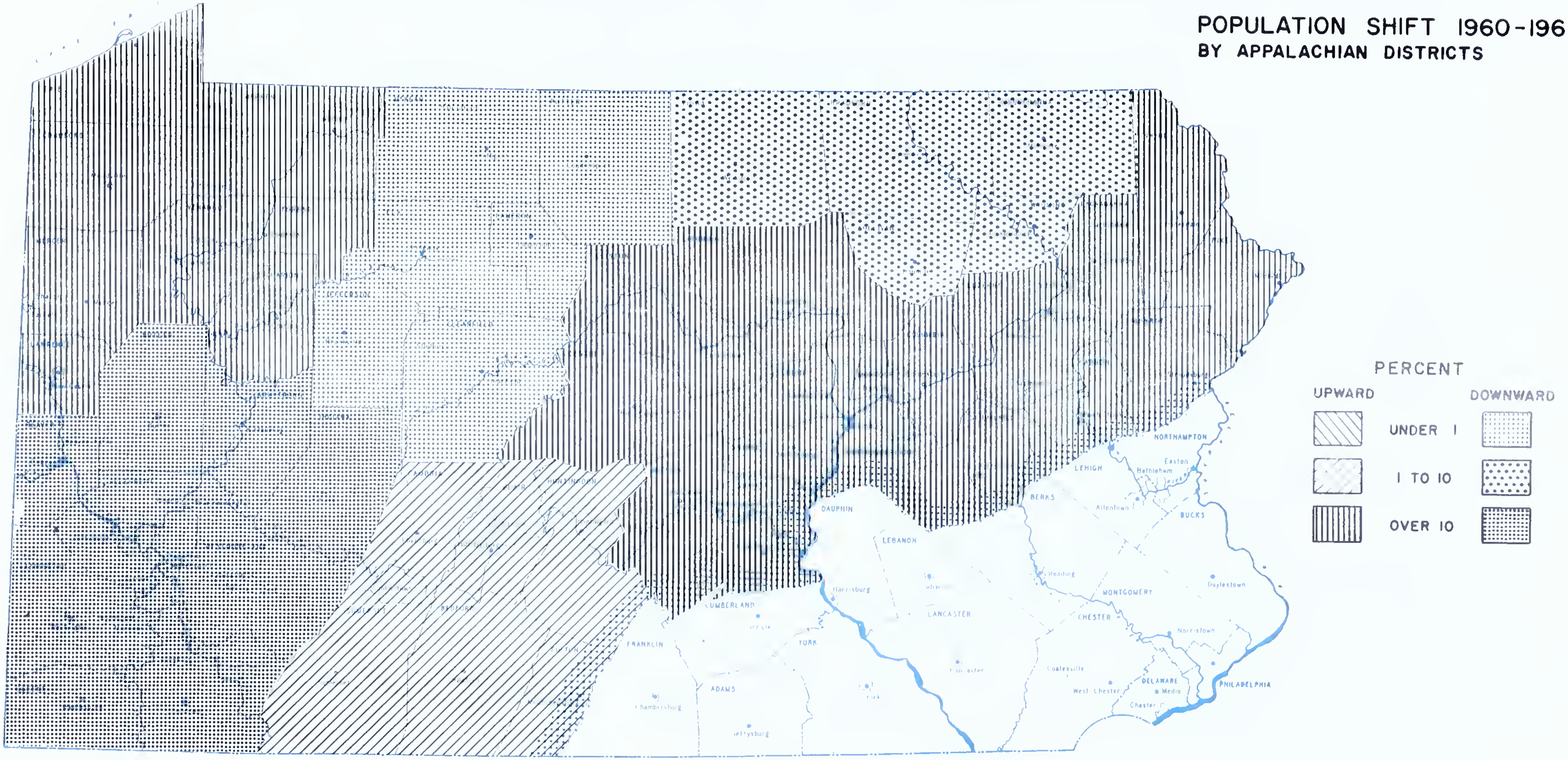
The application of this technique to population in Local Development Districts reveals that the Central Susquehanna Basin District experienced the greatest upward population shift, (49%) showing the greatest comparative population growth vitality of any district in Appalachia Pennsylvania (see last column on Table 3). The Northwestern District is second in growth and the Northeastern District a close third. On the other hand, the Southwestern, Turnpike, North Central, and Northern Tier Districts have experienced a population change resulting in population losses greater than the norm for Appalachia Pennsylvania as a whole. In fact, among all of the seven Districts of Appalachia Pennsylvania, the Southwestern District experienced the greatest out-migration, and absolute loss of population between 1960 and 1965. This trend is due primarily to the losses suffered by Allegheny County, which experienced a downward population shift far in excess of the other counties in Appalachia. However, Westmoreland County, Allegheny's neighbor, apparently gained much of what Allegheny lost, giving it the highest positive population shift in Appalachia Pennsylvania (see Map 13 and Table 4). Similarly, Cambria County suffered the second highest negative population shift while its growing suburbs in Somerset County produced a fairly high positive population shift.

A more detailed review of the economic and population trends in each of the Local Development Districts shows that the Central Susquehanna District gained 19,207 people between 1960 and 1965, for the greatest number of any District, due primarily to a large gain in population in Centre County and smaller gains in other counties. Northumberland County was the only exception because it lost several hundred people during this time. Total employment gains were also registered in every county of the District with the greatest gains made in the Bellefonte-State College labor market area.

The Northwestern District also achieved population growth during the 1960 to 1965 period though not as great as the Central Susquehanna Basin District. It gained 4,208 people making it the only other growing District in Appalachia Pennsylvania. This gain came as a result of substantial population increases in Warren and Forest Counties. These increases were nearly offset by

MAP 12

POPULATION SHIFT 1960-1965
BY APPALACHIAN DISTRICTS



MAP 13

POPULATION SHIFT 1960-1965
BY APPALACHIAN COUNTIES

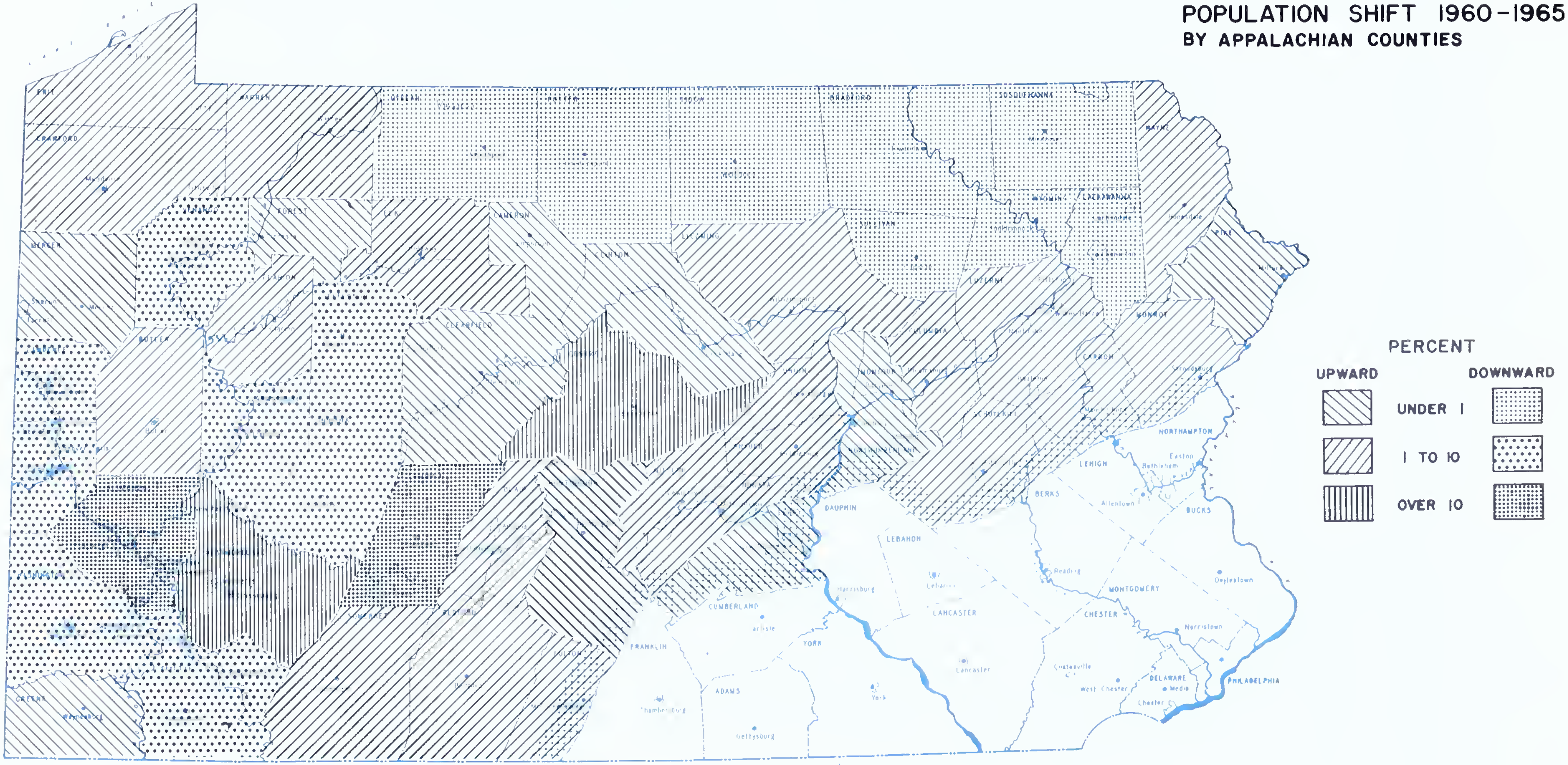


TABLE 4

PERCENTAGE POPULATION SHIFT, 1960-1965, BY APPALACHIA COUNTIES

Counties	Percent Shift by Appalachia Counties
Allegheny	- 52.001
Armstrong	- 3.260
Beaver	- 6.171
Bedford	2.975
Blair	7.368
Bradford	- 0.196
Butler	2.512
Cambria	- 12.258
Cameron	0.244
Carbon	1.838
Centre	10.169
Clarion	1.358
Clearfield	0.823
Clinton	0.351
Columbia	1.396
Crawford	4.113
Elk	1.557
Erie	8.027
Fayette	- 3.070
Forest	0.574
Fulton	1.563
Greene	0.679
Huntingdon	0.753
Indiana	- 3.088
Jefferson	- 1.046
Juniata	1.264
Lackawanna	- 4.649
Lawrence	- 4.042
Luzerne	3.717
Lycoming	2.696
McKean	- 0.845
Mercer	0.225
Mifflin	1.764
Monroe	4.613
Montour	0.537
Northumberland	0.401
Perry	0.158
Pike	0.828
Potter	- 0.958
Schuylkill	2.919
Snyder	3.763
Somerset	2.017
Sullivan	- 0.712

TABLE 4 (Continued)

PERCENTAGE POPULATION SHIFT, 1960-1965, BY APPALACHIA COUNTIES

Counties	Percent Shift by Appalachia Counties
Susquehanna	- 0.227
Tioga	- 0.750
Union	3.737
Venango	- 1.803
Warren	4.271
Washington	- 4.602
Wayne	2.311
Westmoreland	18.479
Wyoming	- 0.329
Total	± 100%

Source: U. S. Bureau of Census (1960 Population) and Pennsylvania State Planning Board (1965 Population Estimates).

declines in the other counties. Since Erie's unemployment rate for 1967 is lower than most of the labor market areas in this District, the labor force may continue to grow, thus increasing total population.

The North Central District has shown a slight decline in population since 1960 (-2,400). This decline has occurred in most of the counties in the District. Cameron and Elk Counties grew 1,200 during the 1960-1965 period. Even though unemployment rates throughout the District declined dramatically, there was sufficient unemployment in the growing labor force to fill new jobs without increasing total population. Unemployment rates in the District must still be lowered substantially to achieve a 3% unemployment rate.

The Northern Tier District has experienced greater losses in population than the North Central District (-2,940). In each of the counties population declines have occurred, particularly in Tioga and Bradford Counties, the most populated of the District. Net out-migration has been greater than natural increase despite employment increases. Substantial reductions in the unemployment rate have occurred in the Susquehanna County, Tunkhannock and Dushore-Laporte labor markets.

The Northeastern District would have had population gains if it were not for Lackawanna County which lost over 8,000 in population between 1960 and 1965. Instead, the District lost 1,281 persons. While the populations of Luzerne, Carbon and Schuylkill Counties remained relatively static, substantial gains were made by Monroe and Wayne Counties. This growth results from the growing tourist-recreation industry in the area with consequent low unemployment rates. In contrast, the Lehighton and Pottsville labor market areas still have unemployment rates in excess of the State average though skilled workers are in demand. Scranton (3.0%) and Pottsville (3.9%) were, at the end of 1967, experiencing their lowest unemployment in decades.

The Turnpike District was second in population decline in Appalachia Pennsylvania during the 1960 to 1965 period with a loss of 7,108. Only Fulton, Bedford, and Huntingdon Counties gained population. Though total employment has risen and unemployment rates have declined, the Altoona labor market in Blair County still retains an unemployment rate over 6%. The Johnstown labor market area is not so slack, however, with an unemployment rate of approximately 5%.

The Southwestern District lost the greatest population (-43,428) during the 1960 to 1965 period. Most of the population loss occurred in Allegheny County where a decline of 38,587 population was estimated. Partially offsetting this loss, Westmoreland County gained an estimated 14,370 persons. In contrast, Washington, Indiana, Armstrong and Beaver Counties experienced comparatively low population declines while Greene and Butler Counties gained slightly in population. This exodus has, in part, been due to an insufficient number of jobs to meet the natural population growth of the District. However, since 1960, employment has increased and unemployment rates have been reduced, in spite of a growth in the civilian labor force.

Employment in the Waynesburg labor market area decreased in contrast with the rest of the District. Unemployment rates for Uniontown-Connellsville (7%), Waynesburg (4%) and Indiana (5%) suggest slow growth of jobs in those areas.

Since 1960, in Appalachia there has been a remarkable decline in unemployment, with of course, some pockets of high unemployment found in those parts of Appalachia where economies are based largely on extractive or other non-growth industries. However, Appalachia Pennsylvania must adjust its economy more toward growth industries that experience less cyclical employment variances if it is to obtain its share of future State growth.

A long-range view of Appalachia Pennsylvania population and employment is optimistic. Table 5 indicates that all Appalachia Pennsylvania Standard Metropolitan Statistical Areas are expected to grow in population to the year 1975. This would mean the present downward population trend in Appalachia Pennsylvania may be slowing within these urban centers with an upturn in population growth in store for these areas in the future (see Map 14). The source for the projected population data -- the National Planning Association -- also projects that the State population will reach a total of 12,848,000 by the year 1975, for an increase of over 1,528,000 people since the decennial Census of 1960.

Table 6 and Map 15 portray the projected outlook for employment in the State's Standard Metropolitan Statistical Areas.

TABLE 5

STANDARD METROPOLITAN STATISTICAL AREA POPULATION PROJECTIONS 1960-1975

(thousands)

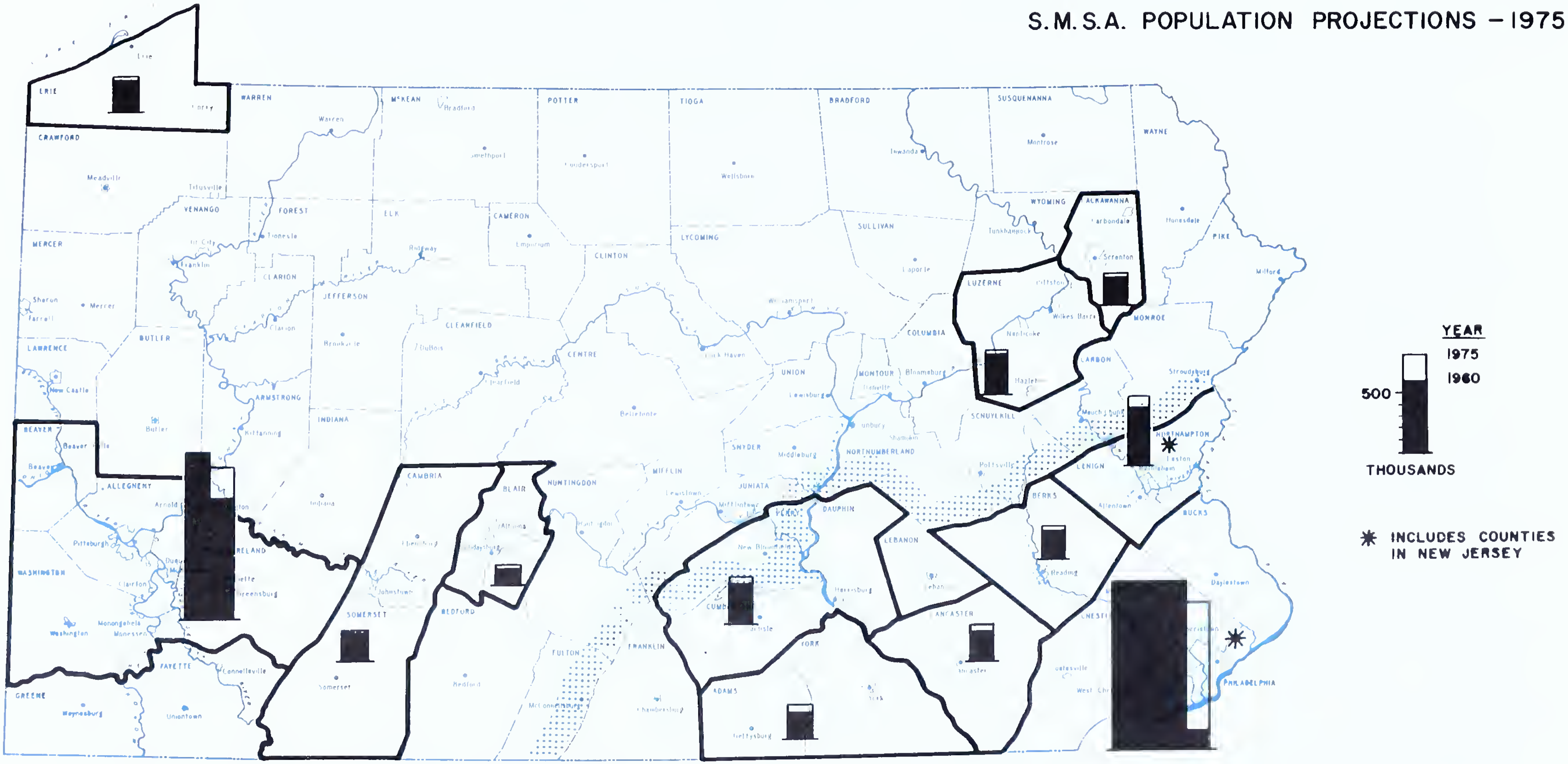
S.M.S.A.	1960	1975	Change	Percent Change
Allentown-Bethlehem-Easton(1)(2)	493.6	551.4	57.8	11.7
Altoona	137.2	145.0	7.8	5.7
Erie	251.5	289.7	38.2	15.2
Harrisburg(2)	346.5	427.8	81.3	23.5
Johnstown	280.5	286.0	5.5	2.0
Lancaster(2)	279.6	308.8	29.2	10.4
Philadelphia(1)(2)	4,361.3	5,168.2	806.9	18.5
Pittsburgh	2,405.4	2,684.6	279.2	11.6
Reading(2)	275.9	293.4	17.5	6.3
Scranton	234.0	243.4	9.4	4.0
Wilkes-Barre	345.9	358.2	12.3	3.6
York(2)	239.3	303.1	63.8	26.7

---

(1) Includes New Jersey Counties
(2) Not included in Appalachia Pennsylvania

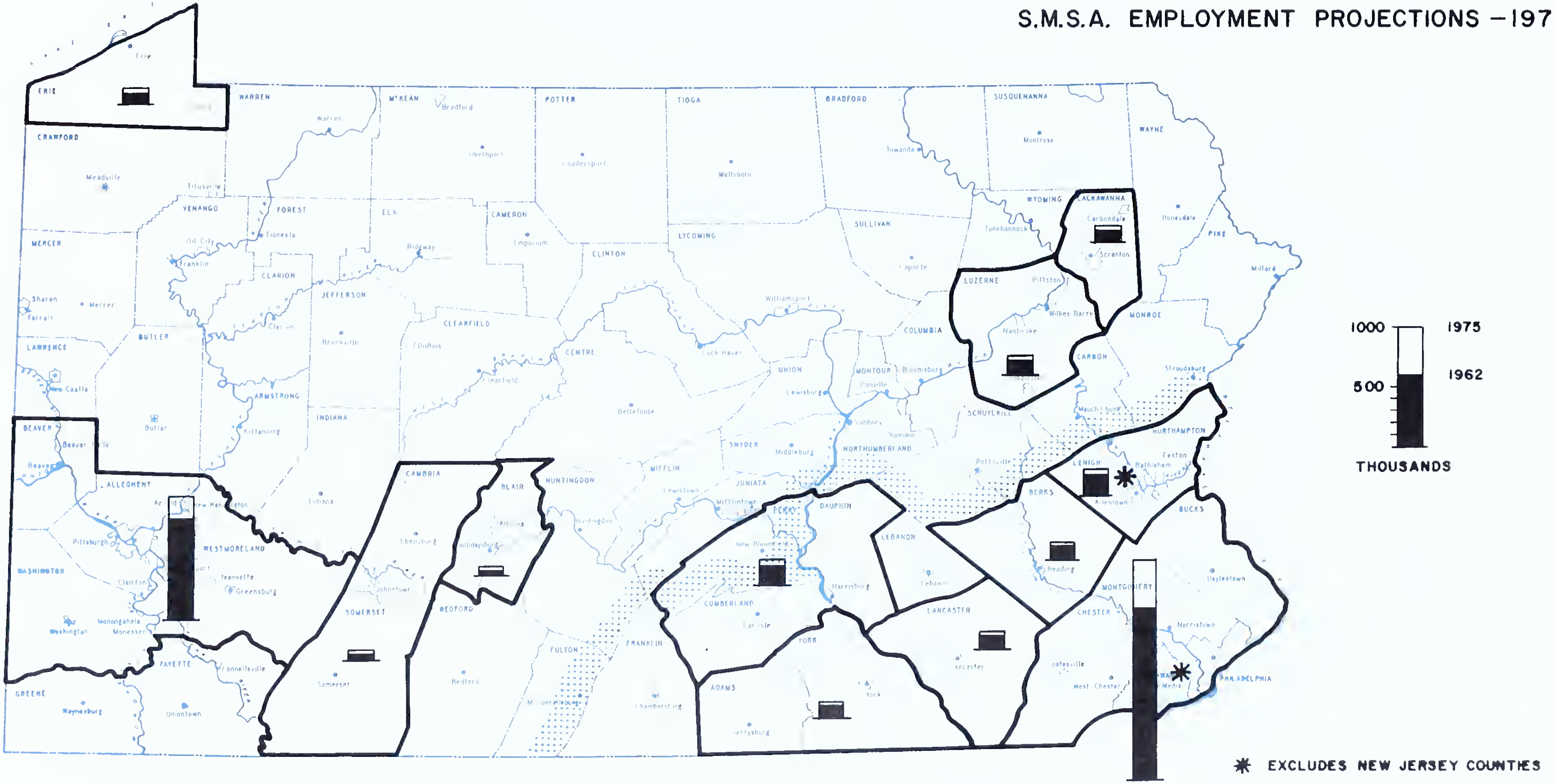
Source: "Economic and Demographic Projections for Two Hundred and Twenty-four Metropolitan Areas," Vol. III, May 1967, National Planning Association, Washington, D.C.

S.M.S.A. POPULATION PROJECTIONS – 1975



MAP 15

S.M.S.A. EMPLOYMENT PROJECTIONS – 1975



* EXCLUDES NEW JERSEY COUNTIES

TABLE 6

STANDARD METROPOLITAN STATISTICAL AREA EMPLOYMENT PROJECTIONS 1962-1975

(thousands)

S.M.S.A.	1962	1975	Change	Percent Change
Allentown-Bethlehem-Easton(1)(2)	177.4	226.3	48.9	27.6
Altoona	47.3	60.8	13.5	28.5
Erie	90.1	111.1	21.0	23.3
Harrisburg(2)	165.0	208.0	43.0	26.1
Johnstown	77.1	92.4	15.3	19.8
Lancaster(2)	120.0	150.5	30.5	25.4
Philadelphia(1)(2)	1,456.4	1,883.8	427.4	29.3
Pittsburgh	831.8	1,094.3	262.5	31.6
Reading(2)	119.4	145.3	25.9	21.7
Scranton	87.9	109.2	21.3	24.2
Wilkes-Barre	127.9	140.5	12.6	9.9
York(2)	123.2	141.9	18.7	15.2

---

(1) Excludes New Jersey Counties

(2) Not included in Appalachia Pennsylvania

Source: "Economic Demographic Projections for Two Hundred and Twenty-four Metropolitan Areas," Vol. I (Revised) May 1967, National Planning Association, Washington, D.C.

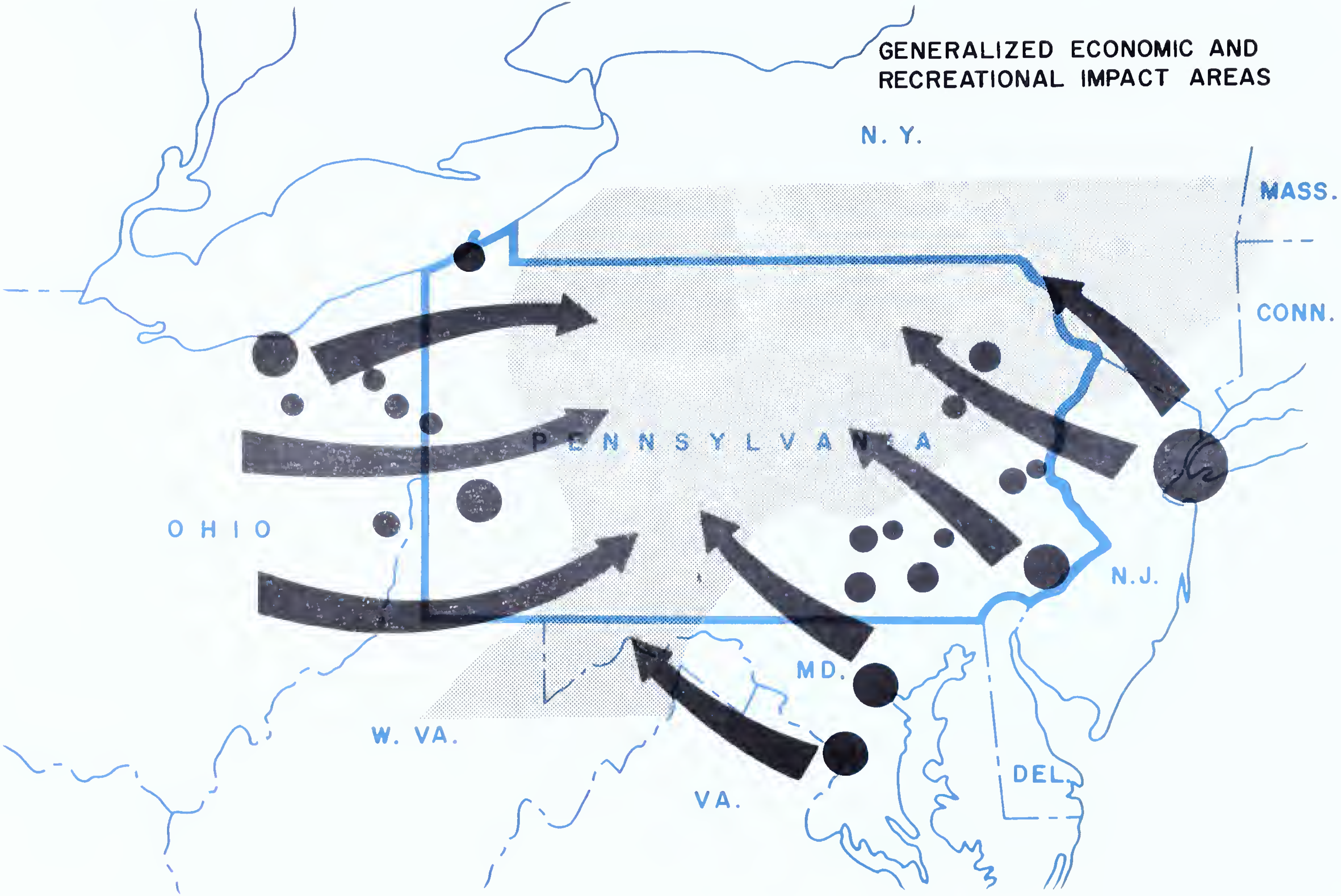
Increases in employment are projected for all metropolitan areas in Appalachia Pennsylvania, with the greatest increases projected to occur in the Pittsburgh area.

The foregoing discussion and supporting maps paint a picture of the State's development as shaped by its physical configuration -- its waterways and mountain ranges, its areas of economic opportunity and its migratory and settlement patterns. In brief, the picture is one of widespread eastern urbanization with rich, supporting agricultural regions, similar dense urbanization and industrialization in the west and strong cords of transportation binding them together, across the southern reaches of the State. The central and northeastern forest areas are interrupted especially where natural resources afforded economic development opportunities -- by coal, lumber, oil and agriculture.

Although Pennsylvania is the Nation's seventh most densely populated state, it still retains approximately two-thirds of its area as a vast central undeveloped or sparsely settled fastness. This central area, much of it to become readily accessible by new and improved highways, affords tremendous opportunities for commerce and recreation. The Generalized Economic and Recreational Impact Areas map (Map 16) shows in diagrammatic form, the pressure for development that will be thrust toward central Pennsylvania from the populous areas of eastern "megalopolis" and the similar Great Lakes-Ohio Valley industrial complex at the west. Map 17 -- Pattern of Urban Recreational Flow -- illustrates the convergence upon central

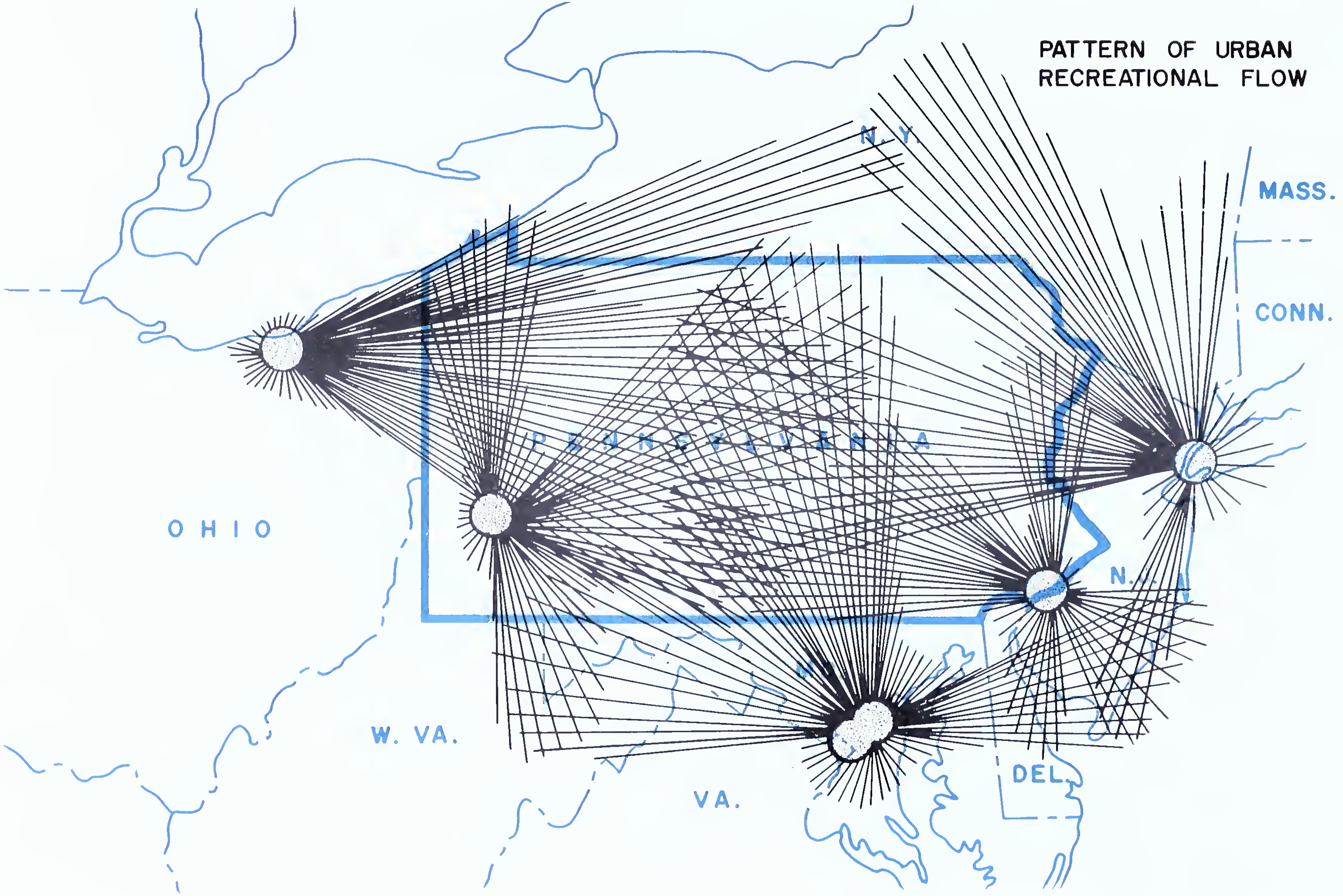
MAP 16

GENERALIZED ECONOMIC AND RECREATIONAL IMPACT AREAS



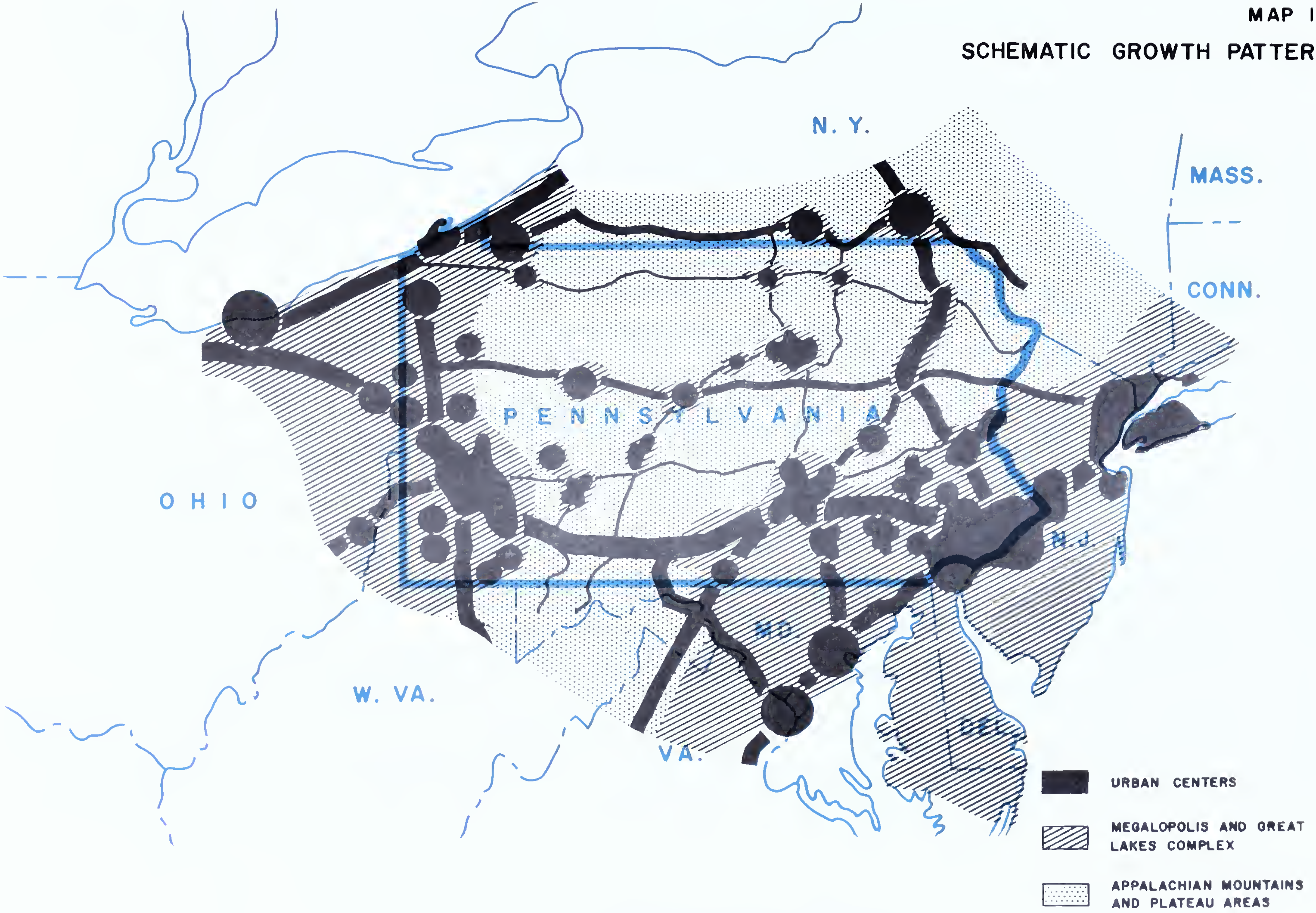
MAP 17

PATTERN OF URBAN RECREATIONAL FLOW



MAP 18

SCHEMATIC GROWTH PATTERN


N. Y.
MASS.
CONN.
PENNSYLVANIA
OHIO
W. VA.
VA.
MD.
N. J.
DEL.
URBAN CENTERS
MEGALOPOLIS AND GREAT LAKES COMPLEX
APPALACHIAN MOUNTAINS AND PLATEAU AREAS

Pennsylvania people seeking recreation from six major metropolitan centers.

The Schematic Growth Pattern diagram (Map 18) presents a synthesis of the foregoing maps -- a pattern of intensive activity in eastern and western Pennsylvania, and a central area of forests, agriculture and cities within which economic growth and recreational and conservation opportunities may be developed in appropriate balance.

These sketch studies of physiography, development, and opportunity form a backdrop against which water resources projects were evaluated. While the projects were weighed on their individual merits and the immediacy of their need, their relation to the total growth picture in Appalachia Pennsylvania was one of the important considerations.

APPALACHIAN REGIONAL DEVELOPMENT PLANNING

The Appalachian Regional Development Act of 1965 is based on the declaration of Congress that the thirteen-state Appalachian region of the United States lags behind the rest of the Nation in its economic growth and that the region's people have not shared proportionately in the Nation's prosperity. Congress found that the region's uneven past development, with its historical reliance on a few basic industries and agriculture, failed to provide the economic base that is a prerequisite for vigorous, self-sustaining growth.

It is the purpose of the Act to assist the Appalachian region in meeting its special problems, to promote its economic development, and to establish a framework for joint Federal and State cooperation. The Act helps provide the basic facilities essential to the region's growth and identify its common problems and meet its common needs on a coordinated and concerted regional basis. It was Congress' analysis and expectation that as the region obtains the needed physical and transportation facilities and develops its human resources, it will generate a diversified economy and that the programs prescribed in the Act will bring Appalachia back into the mainstream of American economic development.

The Appalachian Regional Commission, established by the Act, is directed to "develop, on a continuing basis, comprehensive and coordinated plans and programs" for the overall development of the region. The objective of Appalachian planning is to assure that Appalachian investments will improve the opportunities for employment, the average level of income, the economic and social development of the region and the standard of living by providing the basic facilities needed for growth, developing the region's human resources, and fostering regional productivity.

To carry out the purposes of the Act, the Commission was guided by the idea that regional coordination and planning should be the responsibility of the Commission, that action planning for Appalachian programs and projects should be carried out by the states themselves, and each Governor should be responsible for developing an investment plan to govern the use of funds available under the Act. The underlying assumption is that the individual states are best qualified to determine in their respective areas the locations of significant potential for economic growth and to develop priorities for investing funds where the expected return on public dollars will be greatest.

PENNSYLVANIA APPALACHIA PLAN FOR PUBLIC INVESTMENT

The Governor has assigned responsibility for the Appalachian program to the Secretary of Commerce, who is the State Member and the Governor's representative on the Appalachian Regional Commission. A Bureau of State and Federal Economic Aid, which coordinates all relevant Federal development programs with those of the State, has been established in the Department of Commerce. The State Planning Board prepares the analyses and plans as advisor to the State Member for the Appalachian program in Pennsylvania. The Department of Community Affairs provides additional program assistance. In addition, the

State has established seven Local Development Districts and provides them with financial assistance for such expenses as hiring a technical staff to prepare district development plans and to assist in carrying out the Appalachian program at the local level.

The Act and Rules of the Appalachian Regional Commission require states to prepare development plans to serve as a guide in the allocation of Appalachian funds. Funds were allocated to member states by the Commission according to formulae, which reflect the special needs of each state. Pennsylvania's share in percentages of each program fund is as follows:

Sec. 203	(Land stabilization, conservation, and erosion control)	13.051%
Sec. 211	(Vocational Education)	18.627%
Sec. 212	(Sewage treatment)	25.405%
Sec. 214	(Supplements to Federal grants-in-aid programs)	16.973%
Sec. 302	(Administrative expenses of L.D.D.'s and for Research and Demonstrative Projects)	20.92 %

To meet Pennsylvania's responsibilities for an investment plan, the Pennsylvania State Planning Board, in cooperation with the Secretary of Commerce, prepared a Plan for Public Investment in Appalachia Pennsylvania. This guide for the administration of the Commonwealth's Appalachia program was a blending of the principles of the Appalachian Regional Development Act, the objectives expressed by the Appalachian Regional Commission and Pennsylvania's own objectives and policies for economic and social development within Appalachia Pennsylvania.

The Plan prescribes a process for accomplishing these objectives by establishing review procedures and a scheme for weighing priorities among projects.

One of the basic findings of the Plan is the fact that Pennsylvania, while a part of the Appalachian region as a whole and sharing many of the characteristics common to the region, is also significantly different from the remainder of the region. The Commonwealth's high degree of urbanization and its concentration of heavy industries are distinctive. Railroading, mining, agriculture and steel manufacture suffered heavy employment losses due to technological changes, making the State stand out as a place where stimulation of new economic generators are needed to replace the old ones. As a result of this obvious need, increased employment and increased income are primary policy goals of the State's Appalachia program.

These goals have been further refined in policies that provide for new employment through the stimulation of new economic activity; improve the skills and capabilities of the work force to adjust to changing industrial and technological conditions; and upgrade the urban environment particularly with respect to mine subsidence, mine fires, mine acid pollution of streams, and obsolescence of industrial, commercial and residential areas.

The goals of increased employment and income lead to the emphasis on those public investments which serve to improve Appalachia Pennsylvania's manpower quality and which help in locating new employment or stimulate expansion of existing economic activity. The Plan states that investments are to be made where the potential for future growth is determined to be the greatest.

In achieving these goals two principles of administration have been established: first, that functional state agencies, responsible for administering a particular program, are to determine priorities among proposed projects, and second, that communities, because of their intimate knowledge of local conditions, should propose projects and prepare justifications for them.

On the subject of water resources, Pennsylvania Appalachia policy seeks water resources development which will protect or enhance the expansion of existing and potential employment sources. It also emphasizes that this development should take place in "areas where the potential for growth is the greatest" and in those "centers from which population must be served in order to promote the overall development of the region."

PENNSYLVANIA'S WATER RESOURCES POLICIES

The 4,400 rivers and streams of Pennsylvania have been the object of public concern since the days of William Penn's first conservation instructions to settlers. He directed them to save one acre of woods for every five they cleared, a measure which soil conservationists and hydrologists still laud. Since then a large body of public policies has evolved within the Commonwealth to assure maximum benefit from the State's water resources. The broad goal of these water policies is to promote the integrated development and efficient use of water for a wide range of purposes. Water resources planning and policies are directed at many specific needs ranging from water supply, flood control, and pollution abatement to improvement of recreation, navigation and conservation.

The Department of Forests and Waters has summarized the State's basic water policy in the following manner:

> The forests, waters, and other natural resources of the Commonwealth shall be protected, preserved, developed, managed, and controlled for the public good and benefit and in such manner as to assure that all present and future public needs may be met.

Another important statement of the Commonwealth's goals relating to water is incorporated in the "Clean Streams Law":

> The discharge of sewage or industrial waste or any noxious and deleterious substances into the waters of the Commonwealth, which is or may become inimical and injurious to the public health, or to animal or aquatic life, or to the uses of such waters for domestic or industrial consumption, or for recreation, is hereby declared not to be a reasonable or natural use of such waters, to be against public policy and to be a public nuisance.

These two statements of the State's goals illustrate both the positive and negative dimensions necessary for effective contemporary utilization of water resources. Beyond these objectives there are numerous policies administered by a variety of agencies which impinge on the use of water.

WATER POLICIES

State regulations affecting lakes, streams and ground water touch a score of different subjects, and each policy or regulation reflects a part of the comprehensive program that deals with water resources.

Water Quality is a primary concern of the Commonwealth today because several forms of pollution have contaminated the otherwise abundant supply. The most serious source of pollution is acid from abandoned coal mines which contaminates an estimated 2300 miles of streams in the Appalachian Counties of Pennsylvania. According to the Division of Sanitary Engineering of the Department of Health which has primary responsibility for pollution abatement, "Many additional miles of streams that are normally alkaline have high concentrations of iron, manganese, aluminum, sulfates, hardness and/or dissolved solids as the result of upstream discharges from abandoned mines."

In 1965, the State Legislature asserted in the Clean Streams Law that: "(1) It is the objective of the Clean Streams Law not only to prevent further pollution of the waters of the Commonwealth, but also to reclaim and restore to a clean, unpolluted condition every stream in Pennsylvania that is presently polluted, and (2) the prevention and elimination of water pollution is recognized as being directly related to the economic future of the Commonwealth."

Responding to its responsibilities for curbing water pollution, the Department of Health has developed "Pennsylvania's Ten Year Mine Drainage Pollution Abatement Program for Abandoned Mines" which is being executed in cooperation with the Federal Water Pollution Control Administration, the Department of Mines and Mineral Industries and other State and Federal agencies.

In 1967, Pennsylvania voters approved a $500 million Land and Water Conservation and Reclamation Fund, $150 million of which will be allocated to the Department of Mines and Mineral Industries for abatement of pollution from abandoned mines.

Additional policies affecting mine acid drainage have been instituted by the State Sanitary Water Board which regulates discharges from working mines, both open-pit and underground. New mines may be opened if operators prevent pollution. Open-pit mines must be restored so that exposed coal seams do not contribute acid drainage to surface and sub-surface waters.

Pollution by mine acid, then, is being attacked through several policies, both corrective and preventive. The basic responsibility for these programs is delegated to the Sanitary Water Board, the Department of Health and the Department of Mines and Mineral Industries.

Oil and Gas Well Pollution is a growing problem as unproductive wells are abandoned in north central counties. As yet, Commonwealth policy toward this problem is unformed because the extent of the problem is unknown. The Department of Health recommends research to determine the extent of action required.

Municipal and Industrial Pollution are second only to mine acid as sources of contamination. The Purity of Waters Act (1903) and the Clean Streams Law (1937 as amended through 1965) establish State control over both municipal and industrial wastes. The Sanitary Water Board is responsible for enforcing this law by issuing orders for pollution abatement. In addition, since 1953 the Commonwealth has made grants to municipalities for both construction and maintenance of sewage treatment facilities. (Since 1957, $47 million in construction grants has been awarded to municipalities by the Federal government.) In all some $900 million has been spent by Pennsylvania municipalities for sewage treatment plants and sewer lines in 137 communities. At least 200 additional municipalities need sewage treatment facilities. There are 464 Appalachian communities in Pennsylvania needing either sewage treatment facilities or sewer lines or both.

These facts take on added significance in that the Sanitary Water Board has established water quality criteria for all interstate streams and is presently developing water quality criteria for intrastate streams. To meet these criteria many existing municipal treatment facilities will have to be upgraded to provide tertiary treatment, and municipalities providing no treatment will have to construct facilities.

State action and policy are clearly aimed at curbing pollution although appropriations at all levels of government fall short of the demonstrable need. Among Appalachian communities there is particular need for grants to prevent pollution of the region's abundant water supply -- not only for municipal water requirements, but for industrial and commercial uses which are important to the economic recovery of the region.

The dual problems of industrial pollution and pure water requirements of industrial processes are the most difficult water policy problems. Industries pumping waste into the State's streams are obligated to meet the water quality standards established by the Sanitary Water Board, but compliance is often expensive, and can put an industry at a competitive disadvantage. According to the Department of Health, "consideration should be given to providing some type of economic aid to industries, particularly in Appalachia, for the installation of needed treatment facilities. Such aid might be given in the form of tax incentives, long-term, low-interest loans or in some other form."

The pure water requirements of industries, especially new industries which might be induced to locate in Appalachia, are a compelling economic factor behind the Commonwealth clean streams policy and the need for larger grants for treatment facilities.

Reservoir Pollution, according to the Health Department, is another area in which policy -- Federal policy, rather than State -- is desirable. The Department recommends that "Adequate planning should be conducted and funds should be made available as a part of the Appalachian program to provide sewerage facilities at all Federal reservoirs having recreation included as one of the uses."

Silt Pollution Abatement resulting from construction of highways, dams and other improvements is also the subject of Commonwealth policy which takes the form of cooperation between the Department of

Health and the agency responsible for construction.

The policies to improve water quality are perhaps the most complex, expensive and involved of Commonwealth goals related to water. However, there are many more policies besides those affecting water quality which impinge on the use and development of this resource.

Water Supply is a matter of State concern. Laws and regulations governing purity, protection of watersheds, withdrawal from streams and similar matters have long been established. The Sanitary Water Board is concerned with the quality of these water supplies and the Water and Power Resources Board regulates the quantities which may be withdrawn from the State's rivers and streams. (Interstate compacts are being instituted as well to regulate withdrawals from interstate rivers and streams.)

Navigation is a concern not only of the United States Army Corps of Engineers which is charged with maintaining channels and locks on certain rivers, but also the Pennsylvania Fish Commission which regulates boating on the Commonwealth's rivers and streams.

Support to Port Authorities through enabling legislation and appropriations has been a major interest of the Commonwealth at Philadelphia, Pittsburgh and Erie, an interest growing out of enormous Commonwealth expenditures in the 19th century for the statewide canal system known as the State Works.

Impoundment of water is under the jurisdiction of the Water and Power Resources Board (of the Department of Forests and Waters) despite the fact that impoundment occurs for many different reasons --

flood control, navigation, water supply, erosion control and wildlife propagation. Other agencies are involved depending on the particular reasons for the impoundment.

When flood control is the goal, the United States Army Corps of Engineers often undertakes the project and coordinates its activities with the Department of Forests and Waters. For smaller State flood control projects, the Department of Forests and Waters is responsible for the work and coordinates with other appropriate State Departments, including Health, Commerce, Highways, Mines and Mineral Industries, the Fish and Game Commissions, the Soil and Water Conservation Commission, the General State Authority and the State Planning Board.

Impoundment for water supply is regulated by the Water and Power Resources Board with approvals from the Secretary of Health and the Public Utilities Commission.

Impoundment for conservation and to prevent soil erosion is undertaken by the State Soil and Water Conservation Commission through soil and water conservation districts. Such watershed projects involve water storage for agricultural and domestic use. Similarly, the Department of Forests and Waters manages State forest lands for watershed protection and runoff retardation.

Impoundment for propagation of wildlife is a goal of the Fish Commission which constructs dams to impound water for fishing lakes while the Game Commission impounds water for waterfowl.

Finally, advance acquisition of reservoir sites is a part of the responsibility of the Department of Forests and Waters. Under the Commonwealth's PROJECT 70 program, land for future reservoirs may be acquired although in practice, the Department acquires land just prior to construction. This power allows acquisition of land which might later be prohibitively expensive.

Diversion of streams and Withdrawal of water from them are regulated by the Water and Power Resources Board, also. Related to diversion and impoundment are the questions of encroachment into stream channels and channel changes, both of which are likewise controlled by the Water and Power Resources Board.

Hydroelectric Power production is subject to policies and regulations of the Water and Power Resources Board and the Fish Commission (the latter being concerned with the provision of fishways at hydro-power structures).

Recreational use of water receives high priority among Commonwealth agencies, particularly the Department of Forests and Waters which plans and operates the State Park system. A Departmental goal is a network of state parks serving all urban and rural areas and most of these are planned around an existing stream or a reservoir built as part of the development. The Game and Fish Commissions, as already mentioned, develop impoundments for their recreational functions. Local units of government are authorized by State law to expend money for similar recreation uses, and portions of the $70 million bond issue approved by voters for expanded recreation lands were allocated to them also.

Historic Preservation efforts are often closely related to recreation developments and frequently involve water courses of historic significance including canals, mill races and other uses of water in the past. Identification of worthy historical projects is the responsibility of the Pennsylvania State Historical and Museum Commission which receives State appropriations as well as a portion of funds from PROJECT 70.

Public Ownership of certain streams has been declared by legislative enactment and riparian rights have been defined by law and judicial decisions.

Where different levels of government are involved, State law provides for local-State-Federal cost sharing and cooperation. For interstate streams compacts are the most promising form for cooperation. The Commonwealth has already joined with other states in the Delaware River Basin Commission, the Great Lakes Commission, Interstate Commission on the Potomac River Basin, Pennsylvania-Ohio Pymatuning Compact, Ohio River Valley Water Sanitation Commission and the Interstate Advisory Committee on the Susquehanna River Basin. Efforts continue to broaden these relations into compacts through which river basin management can be insured.

Policies concerning Ground Water remain largely the province of municipalities and counties which regulate installation of sumps, septic tanks and other on-site sewage disposal which can pollute ground water. The Commonwealth does license well-drillers who are required to maintain logs.

WATER PROBLEMS AND POTENTIALS

The variety of Commonwealth water policies highlights many of the concerns that surround a decision to enhance water resources -- to build a dam, curb pollution discharges or create new sources of water supply. Solutions to water problems usually result in new or renewed water resources. One action may have important ramifications for municipalities, industries, businesses, sportsmen and naturalists simultaneously. Consequently, water resource planners try to weigh all of these interests as they evaluate proposals.

The United States Army Corps of Engineers, for example, performs a cost-benefit analysis on proposed projects in which they consider the value of water supply, flood damage protection, fish and wildlife propagation, hydroelectric power production, navigation demand, pollution abatement and recreational use. The old-fashioned, single-purpose concept of water projects has been superseded by the multiple-purpose approach.

The interrelatedness is apparent to most readers; it is the central consideration that has led to comprehensive river basin planning such as that in progress in the Delaware, Susquehanna, Ohio and Potomac basins. Even so, the importance of individual factors varies from place to place, from basin to basin and within basins.

On the Delaware, for example, impoundment for water supply and recreational activity are dominating requirements because of the pressures of eastern seaboard cities. On the Susquehanna, flooding and acid water from mining operations are the salient concerns, while on the Allegheny and Monongahela Rivers, mine, industrial and municipal pollution are fundamental considerations. Within the Ohio Basin, however, flooding problems remain in some areas, and throughout the basin from Pittsburgh to Wheeling, the foreseeable demand for water sports, especially boating, will far out-strip the supply.

While we observe on the one hand that the most efficient means of achieving these various goals is to use a comprehensive approach, we also acknowledge that specialists are required for complex matters such as recreation planning, hydrology, sanitary engineering, and similar matters.

Recreation planners, by virtue of long experience, know almost instinctively where water courses have unrealized potential for recreation development; hydrologists reviewing flow data can quickly identify useful impoundment locations, and sanitary engineers have recently revealed their ability to spot certain kinds of pollution from airplanes.

While all of Appalachia Pennsylvania has not been subjected to detailed study by specialists in each water resource discipline, much work has been completed which generally reveals the conditions and possibilities within the State.

CONDITIONS

Existing conditions might be termed problems especially where they are conditions that inhibit development or damage the economic underpinning of an area. The most obvious water problems are flooding, pollution and water supply.

Flooding

A general survey of Pennsylvania instituted by the Corps of Engineers revealed that 45 communities of 2,500 or more population are subject to major floods (see Table 7 and Map 19). (A major flood is one in which 40% of the community's buildings have been flooded in the past). In these communities flood protective works are still lacking. There are, in addition, other communities, industries and highways in Appalachia not listed in which equally severe flooding can occur.

Necessarily, each community requires separate examination and the costs and benefits change from year to year as new buildings are constructed in areas subject to flooding and new impoundments are built upstream reducing hazards. Hence, there is no overall estimate of needs and costs, but there is remarkably common agreement by the Corps of Engineers, the U.S. Department of Agriculture's Soil Conservation Service and the Pennsylvania Department of Forests and Waters on the most serious flooding problems.

To illustrate the extent of this consensus a questionnaire distributed to local officials and State agencies, as well as lists of projects by the Corps of Engineers, brought forth specific recommendations for 89 flood control projects needed throughout Pennsylvania Appalachian counties. Of these, the ten most pressing were quickly settled upon by State flood control experts. Thus, in the absence of long-term, expensive statewide analysis of flooding, such expert evaluation and agreement is the best possible index of conditions and needs.

TABLE 7
MAJOR FLOOD PROBLEM COMMUNITIES IN APPALACHIA PENNSYLVANIA

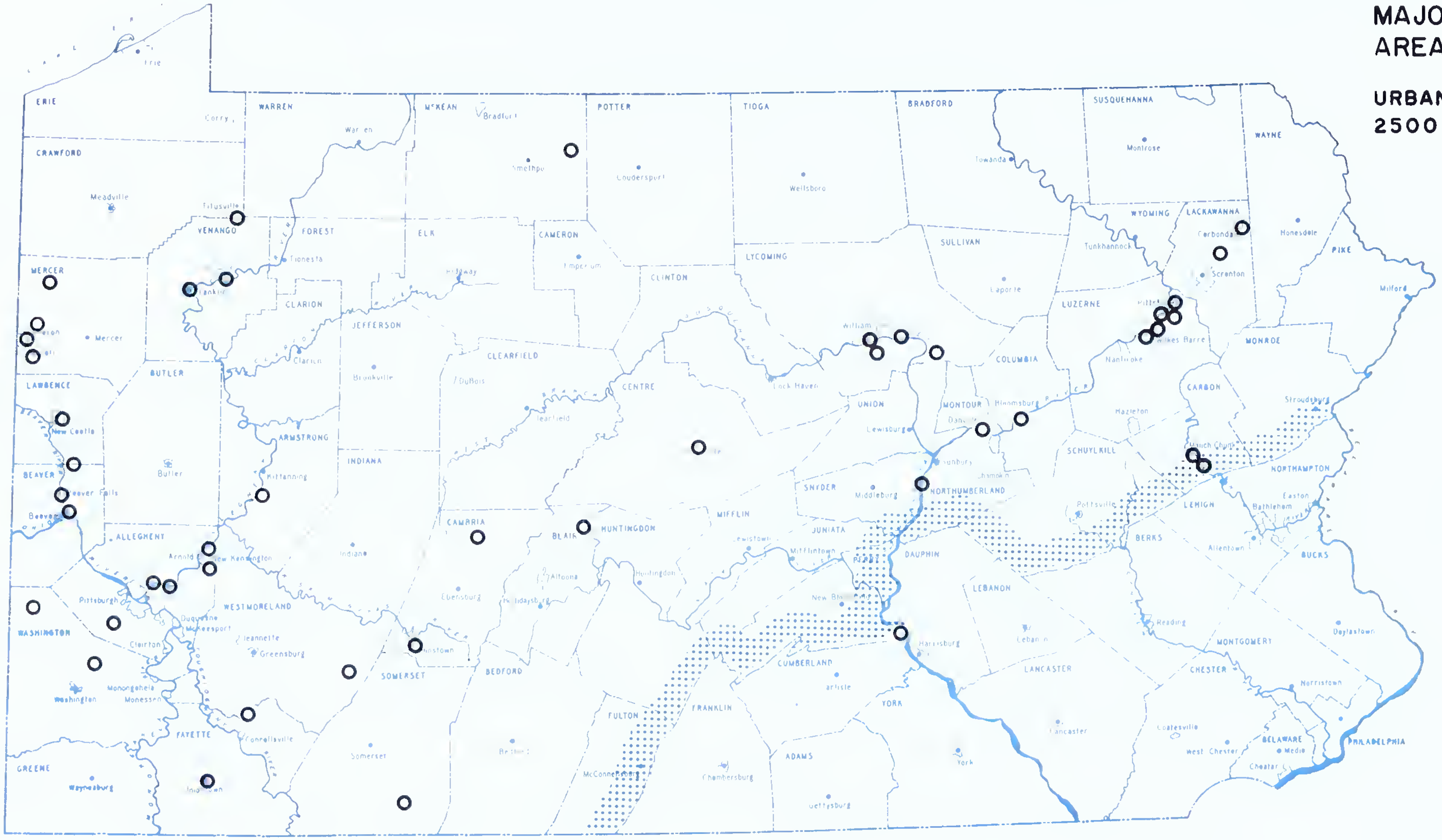
County	Community
Allegheny	Bridgeville
	Etna
	Sharpsburg
	Tarentum
Armstrong	Ford City
Beaver	Beaver Falls
	New Brighton
Blair	Tyrone
Cambria	Johnstown
	Patton
Carbon	Jim Thorpe
	Lehighton
Centre	Bellefonte
Columbia	Bloomsburg
Crawford	Titusville
Fayette	Uniontown
Lackawanna	Carbondale
	Blakely
Lawrence	Ellwood City
	New Castle
Luzerne	Exeter
	Forty Fort - Swoyersville

County	Community
Luzerne (continued)	West Pittston
	Wyoming-West Wyoming
	Wilkes-Barre
Lycoming	Montoursville
	Muncy
	South Williamsport
	Williamsport
McKean	Port Allegheny
Mercer	Farrell
	Greenville
	Sharon
	Sharpsville
Montour	Danville
Perry	Marysville
Snyder	Selinsgrove
Somerset	Myersdale
Venango	Franklin
	Oil City
Washington	Burgettstown
	Cannonsburg
Westmoreland	Ligonier
	New Kensington
	Scottdale

Source: Water Resource Branch, Pennsylvania Department of Forests and Waters

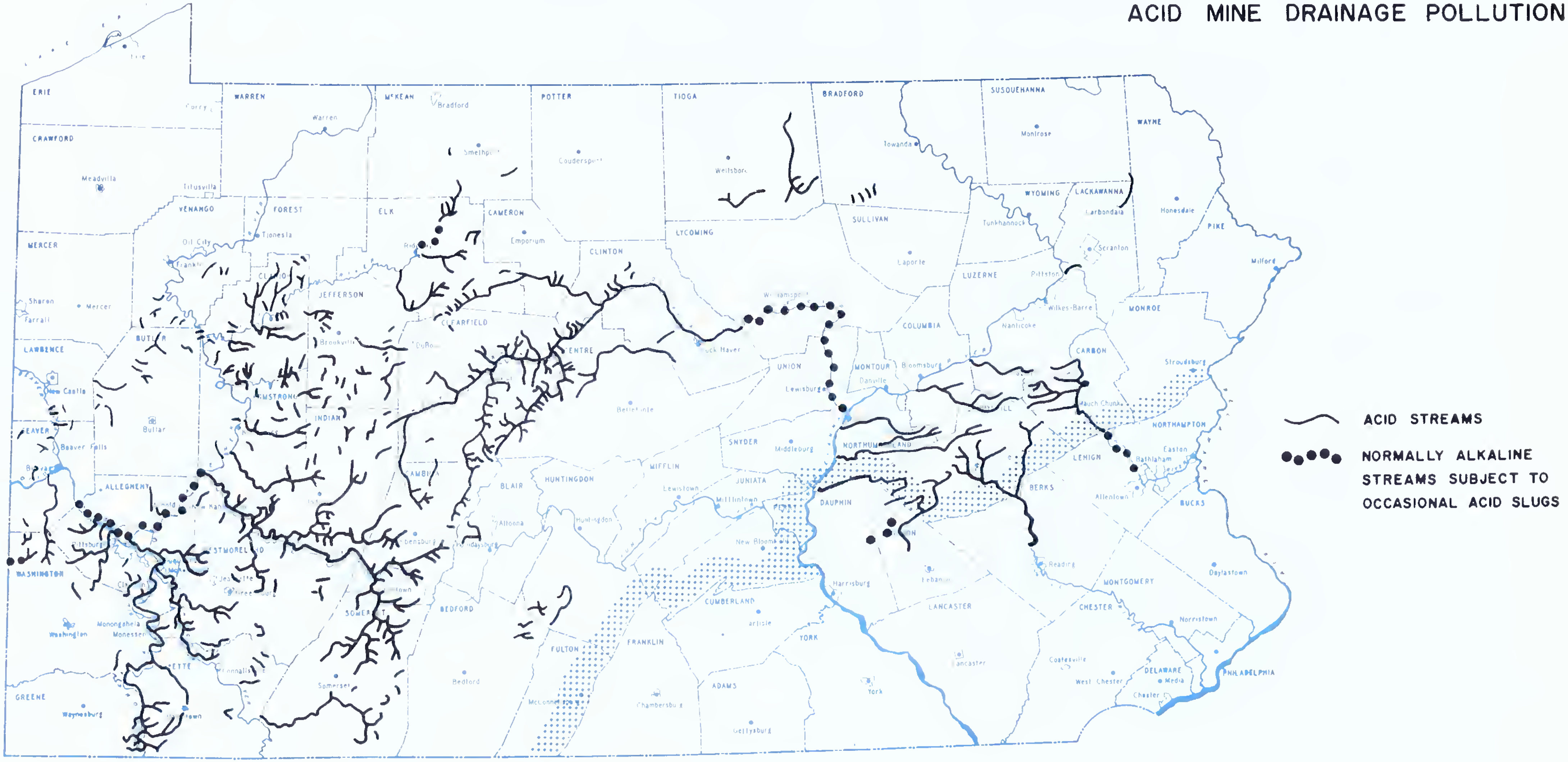
MAJOR FLOOD PROBLEM AREAS IN APPALACHIA

URBAN COMMUNITIES OF 2500 OR MORE



MAP 20

ACID MINE DRAINAGE POLLUTION



Mine Drainage

Another illustration of the value of such specialization is revealed in pollution control. Here the Division of Sanitary Engineering of the Pennsylvania Department of Health has conducted extensive surveys and has developed long-term programs for pollution abatement. Five distinct sources of pollution are apecified in its reports: acid mine water; oil and gas well contamination of ground waters; municipal wastes; industrial wastes and siltation from highway, dam and other construction projects. Of the five pollutants, the most serious are mine acid and municipal pollution. Maps 20 and 21 illustrate the distribution of these problems. Map 20 shows the streams which acid and those that are normally alkaline but subject to surges of acid from rainstorms called "slugs." Map 21 shows the streams having water quality problems resulting from sewage and biodegradable wastes.

The Division of Sanitary Engineering reports that an estimated 2,300 miles of Pennsylvania streams (most of them in the 52 counties of Appalachia) are acid from mine drainage, and many additional miles are unusable because of other minerals such as iron, manganese, aluminum, sulfates, and dissolved solids that come from mine wastes. By 1967, an estimated 2,750 tons of acid (shown in chart below) were pouring into the State's three major river systems daily. The extent of this pollution is mapped (Map 20) to illustrate which areas of the Commonwealth suffer most. (Not shown are several reservoirs also polluted where recreation development has been inhibited). Not unexpectedly, these are also the areas with long histories of underground mining, but perhaps more surprising is the extent to which unreclaimed open-pit mining (see Map 22) has affected streams in the anthracite region and in the bituminous country of Clearfield, Jefferson, Clarion, Indiana, Butler and Armstrong Counties. Open-pit mines not only result in pollution when coal seams are left exposed, but the water caught in them often goes into the ground water system which passes through abandoned deep mines, thereby polluting sources of ground water supply as well. A cause of the large mine drainage problem is that adequate legislative controls were not enacted until 1965. Where mining has been discontinued, often discharges of pollution continue, and public funds are needed to abate them.

Acid Flows in Pennsylvania Rivers

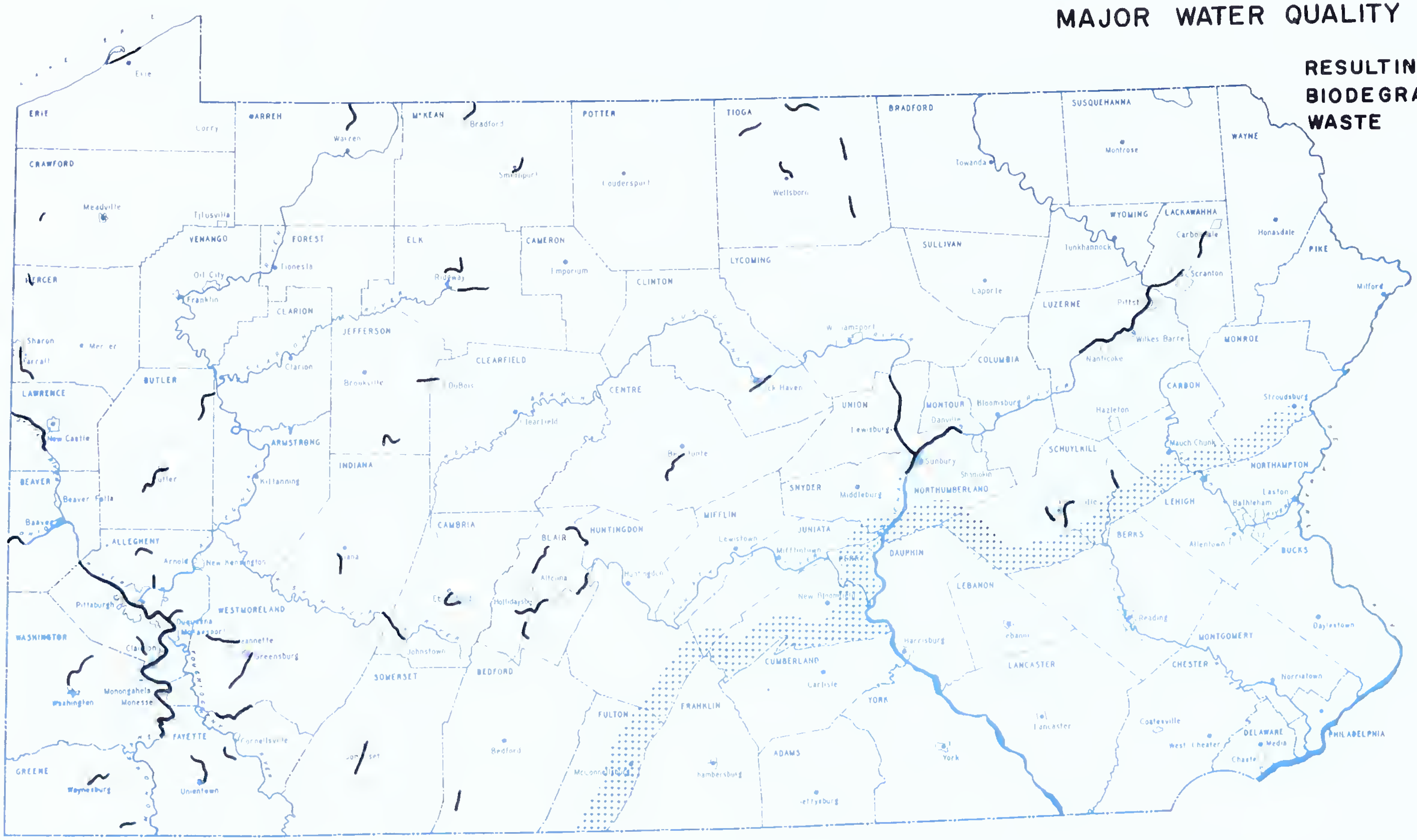
River Basin	Acid Tons Per Day
Delaware	50
Main Stem Susquehanna	350
North Branch Susquehanna	600
West Branch Susquehanna	500
Allegheny	400
Monongahela	650
Ohio-Beaver	200

A ten-year mine drainage abatement program was instituted by the Department of Health in 1965, in cooperation with State and Federal agencies -- most notably the Federal Water Pollution Control Administration and the Pennsylvania Department of Mines and Mineral Industries. (The latter agency has responsibility for mine sealing and back filling operations). Total cost of the program is expected to exceed $250 million dollars, a figure likely to increase as field

MAP 21

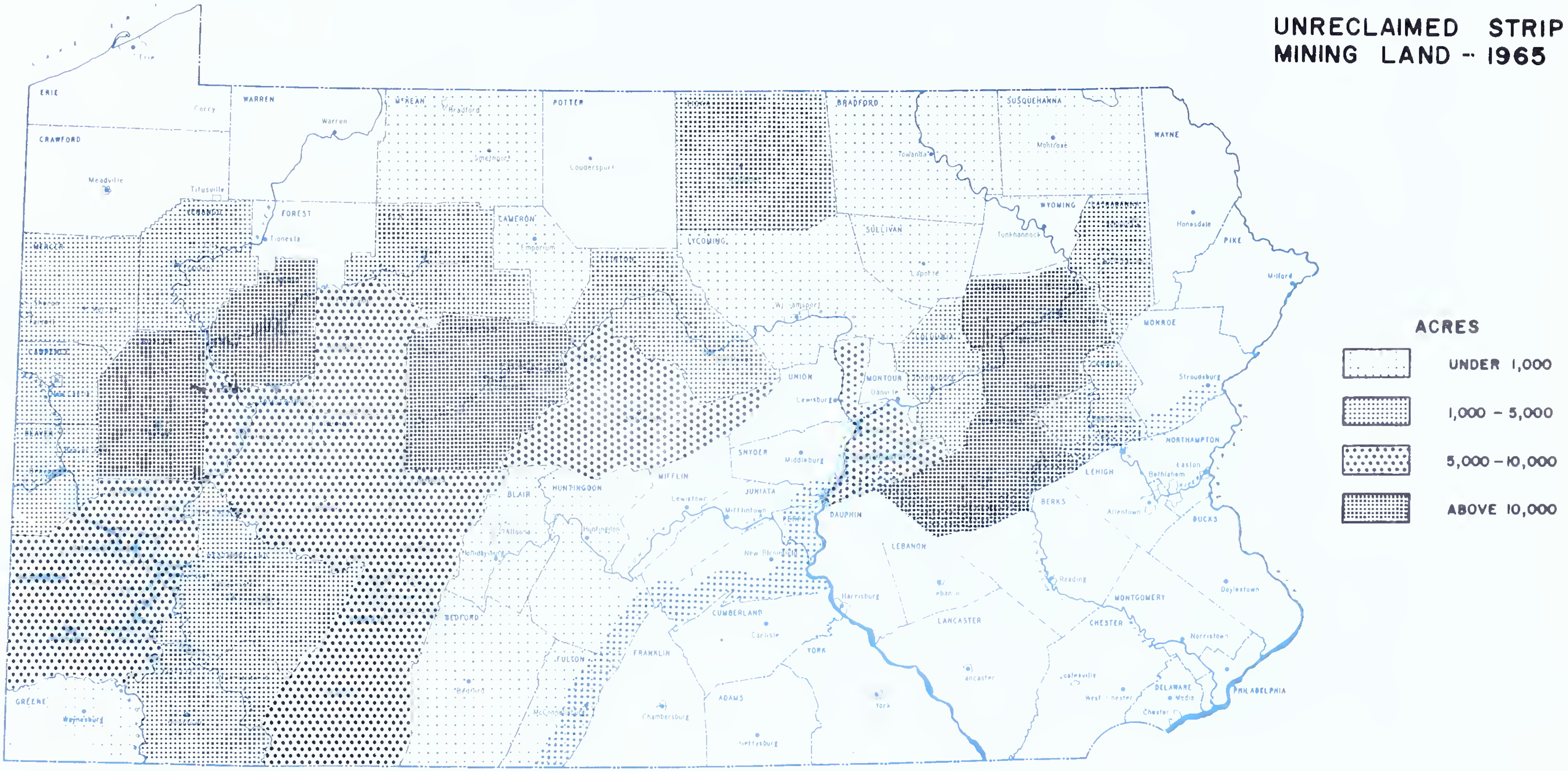
MAJOR WATER QUALITY PROBLEM AREAS

RESULTING FROM SEWAGE AND BIODEGRADABLE INDUSTRIAL WASTE



MAP 22

UNRECLAIMED STRIP MINING LAND – 1965



surveys and engineering designs are completed.

Oil and Gas Well Contamination

The Division of Sanitary Engineering notes that pollution from oil and gas wells is small in comparison to that resulting from mines. Even so, between 100,000 and 150,000 oil and gas wells in north-central Pennsylvania have been abandoned and constitute a problem. Funds are needed to determine how serious the matter is.

Municipal Wastes

Second to mine wastes in terms of seriousness, municipal sewage is responsible for widespread pollution of the State's rivers. As explained by one sanitary engineer, the typical approach of municipalities in the past has been to use deep wells or impound small tributary streams for water supplies and use rivers for waste disposal. Consequently, much corrective work is required.

In the 52 counties of Appalachia Pennsylvania, the Division of Sanitary Engineering reports that 464 municipalities are in need of sewage treatment systems and/or sewer lines. Preliminary estimates are $290 million for treatment and $90 million for collection systems. A priority list for Federal grants is developed by the Department of Health and illustrates the extent of problems in Appalachian counties in that 59 of the 99 priority communities are in this section.

As with acid pollution from mines, the problem of municipal wastes is complicated by technical considerations. The most obvious of these is the degree of treatment-primary, secondary or tertiary-waste receives before it is returned to a stream. If rivers are to be returned to a "clean" condition, standards of treatment must rise. Indeed, the Sanitary Water Board is now considering regulations which will require upgrading of 138 primary and intermediate treatment plants in Pennsylvania if adopted. Many small communities are finding the treatment costs high despite State and Federal grants; some are joining their neighbors to build and operate plants to achieve economies.

Industrial Wastes

An estimated 1,100 industries discharge wastes into the rivers and streams of Appalachian counties. Of these an estimated 934 are providing at least minimum treatment, another 94 provide no treatment but are in the process of installing treatment facilities, and another 77 do not treat their wastes and are in violation of the Clean Streams Law.

Of the 934 industries now complying with the Clean Streams Law there is an undetermined number providing minimum abatement whose discharges still cause some pollution. Many of them are located on acid or acid impregnated streams which mask the contamination of these discharges. About 100 fall into this category -- a fifth of them being pulp, paper and steel mills. Most of them discharge biodegradable wastes which are generally difficult and expensive to treat.

STATE WATER POTENTIALS

A balanced view of water resources in Appalachia requires not only identification of adverse conditions but realization that much corrective work has already been completed and that undeveloped potentialities for improvement of the social and economic environment exist. Many municipalities pollute nearby streams, but many more have treatment plants. Numerous industries discharge untreated or insufficiently treated wastes into streams, but many more do not; and if mining in the past resulted in unrestricted acid flows into streams, it is prohibited today.

Industrial Development

These improvements are more than esthetic when they upgrade the quality of water. In some cases they have been necessary for industries where water pollution was adding to manufacturing costs. In other instances, stream quality improvement, (like flood protective works), has the obvious effect of making industrial sites more attractive to industrial prospects.

Such benefits are not always immediately measurable because there is no way of knowing what will be developed on a vacant river front site. A marina or a shoe factory or a power plant -- each has a different social and economic significance, and for the most part, the decision about what will go there begins in the locality with zoning and development efforts. Even so, potential may not exist at all unless some steps are taken.

Many local planning studies have identified such sites, but no agency seems to have attempted a comprehensive examination of them as a part of flood prevention planning and water quality control. Therefore, even with as useful a concept as the "minimal possible river stage to which the 100-year flood could be reduced" throughout the Ohio River basin, it is still not known how much land would be made "flood free." Undoubtedly, however, this minimal river stage could be converted to acreages of both developed and undeveloped land that would be protected.

Such estimates are, of course, available as individual impoundments are studied. But no basin-wide figures have yet been developed. Hence, no statewide or Appalachian estimate of the industrial potential is now possible.

Nor can the significance of improved water quality be easily measured although sanitary engineers can describe instances where polluted water adds appreciably to manufacturing costs because it must be treated before it can be used. There is no record of the number of industries adversely affected in this way, and there is no way of knowing how many water using industries have not moved to Pennsylvania for this reason. Nevertheless, development authorities are ceratin that the cleaner the water, the wider the appeal the State has to industrial prospects.

Other Commercial Potential

Additional economic ramifications are implicit in river basin development -- some actions protect existing business and others enlarge business possibilities. Establishment of navigation is an obvious possibility for a variety of business developments although there is little expectation today for a greatly enlarged navigation system.

Perhaps recreation affords the largest sector of non-industrial business opportunities through water resource development. Service establishments for boating, camping, supplies, resorts, etc., immediately come to mind, but somewhat less apparent are the larger commercial linkages of boating that range from the manufacture of the original boat to supplying it with necessary rigging. In a sense, the construction of a lake insures the blossoming of parts of this recreation industry, a fact that is well-known to development specialists. It is a significant fact, if not always sufficient reason alone, for reservoir construction.

Recreation

Aside from economic considerations, recreation also represents a potential for the pleasure of people, and among recreational outlets sought by people water-related activities are among the most popular. Boating alone is expected to grow phenomenally throughout Appalachia -- in river basins of Pennsylvania (together with small sections of adjoining states) the estimated 95,000 acres of water available for boating in 1967 should grow to 686,000 by 1980 to meet the demand expected by the Bureau of Outdoor Recreation (U.S. Department of Interior).

Table 8 and Map 23 show the boating impoundment needs of Appalachia Pennsylvania to 1980. They highlight the fact that the Southwestern Development District has the greatest needs. Demands for fishing and swimming would be largely satisfied if boating impoundment needs are met.

TABLE 8

WATER IMPOUNDMENT NEEDS FOR BOATING
1980

Economic Subregion	1980 Needs for Boating(1) Area (Sq. Mile)	Annual Activity Days (thousands)	Acres of Impounded Water(2)	Acres per Sq. Mile
1 (13 counties-3 in Pa.)	10,975	2,948	58,960	5.4
2 (10 counties-7 in Pa.)	9,454	3,134	62,680	6.6
3 (10 counties-all in Pa.)	5,857	2,680	53,600	9.2
4 (11 counties-all in Pa.)	7,493	2,551	51,020	6.8
5 (16 counties-7 in Pa.)	8,027	2,674	53.480	6.7
6 (25 counties-14 in Pa.)	13,362	20,343	406,860	30.4

---

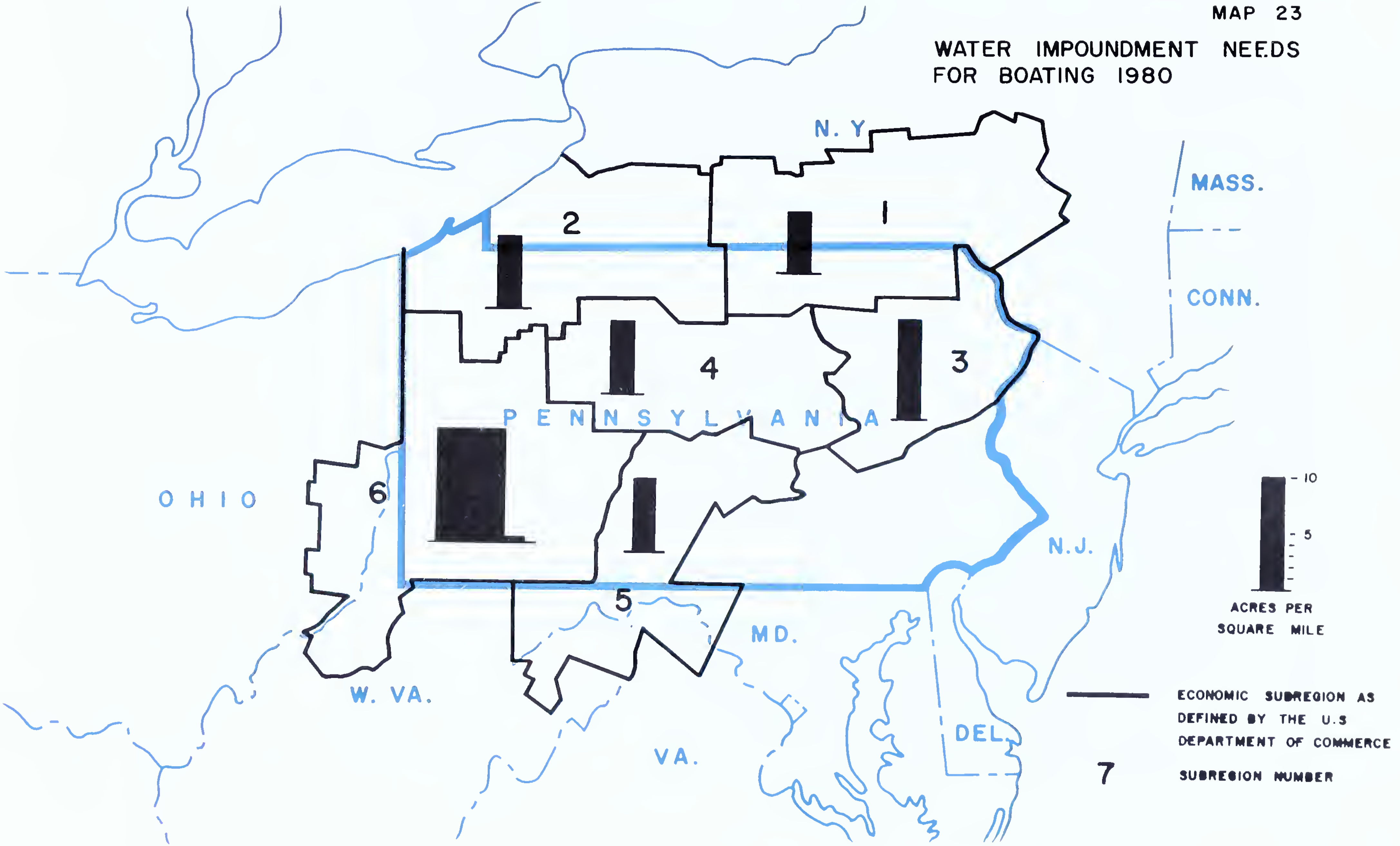
(1) Boating needs include those for fishing and swimming as well.

(2) 50 annual activity days per acre of water impounded.

Source: Based upon "A Report on Outdoor Recreation Demand, Supply and Needs in Appalachia" 1967, Bureau of Outdoor Recreation, U.S. Department of the Interior

MAP 23

WATER IMPOUNDMENT NEEDS FOR BOATING 1980



The State Planning Board Outdoor Recreation Plan projects substantial increases to State Parks as well. These growth figures are shown by State Planning Board Regions on Map 24, "State Park Annual Attendance Projections-1980" and Table 9. Map 25 shows the location of proposed State Parks and Federal Recreation Areas. (These are listed in Appendix C).

The potential for fishing in water resource development is highlighted by work of the Pennsylvania Fish Commission. This potential is emphasized by the Commission where pollution abatement will allow stocking of trout and other game fish.

Similarly, the Game Commission develops impoundments for waterfowl and other game. Its acquisition program calls for 5,000 acres of water and land development for waterfowl in Appalachia by 1975. Its expanding program is based on the growing sales of hunting licenses, duck stamps, etc., which indicate expanding needs.

Water Supply

Fundamental among the opportunities of water resource development is creation of enlarged water supplies. Per capita needs increase annually; so must water supplies even for areas with little population growth. In the Allegheny River Basin alone water supply requirements are expected to climb from 493 million gallons daily to 659 mgd between 1960 and 1980. This is an increase that can be met easily in the aggregate.

Serious water shortages developed in eastern Pennsylvania during the drought of 1960-66 which forced many communities into emergency measures. In some places "accumulated surface water runoff

TABLE 9

ANNUAL STATE PARK ATTENDANCE
1964 - 1980

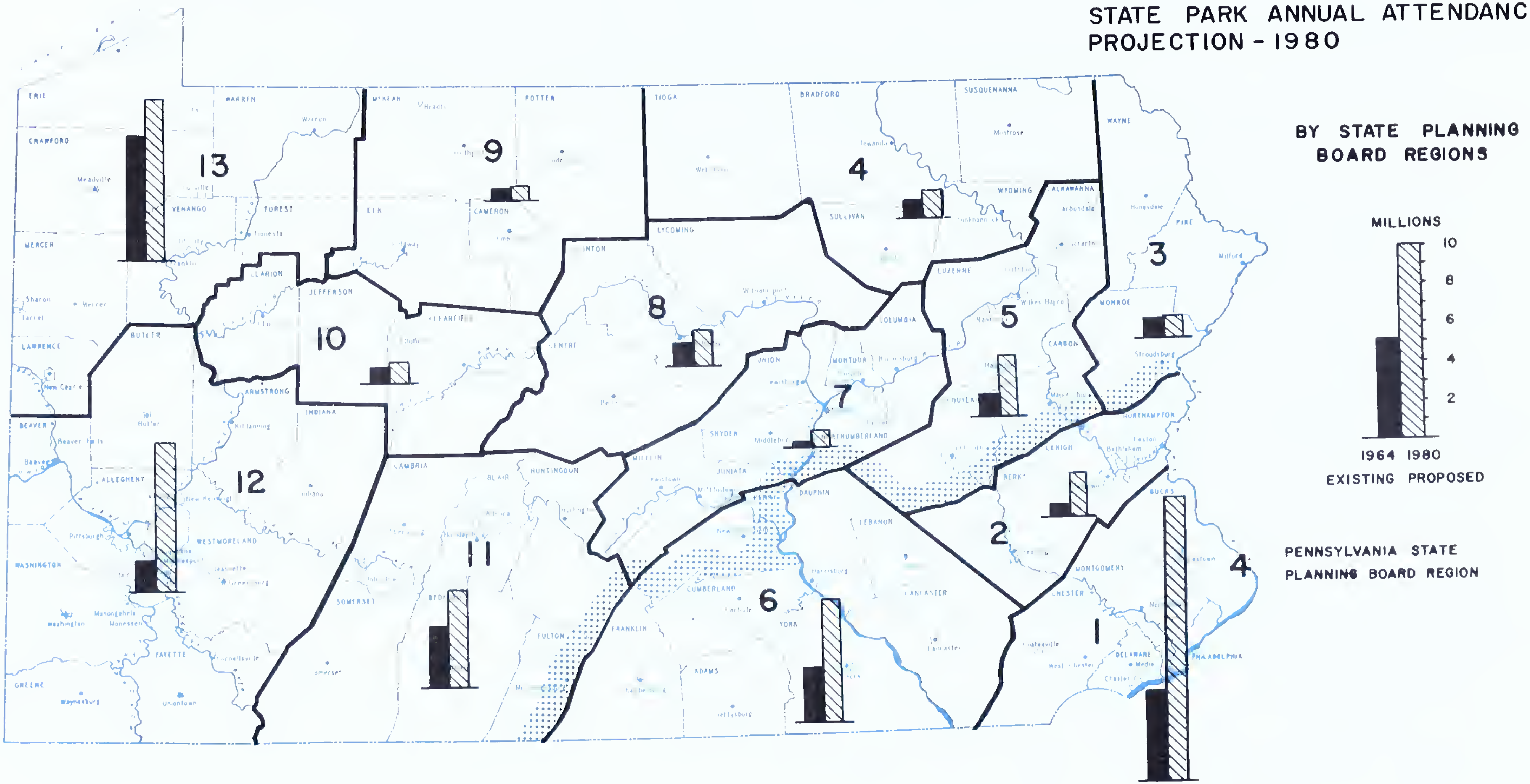
Planning Region	Attendance (millions)	
	1964	1980
1	3.8	14.4
2	0.6	2.3
3	1.0	1.2
4	0.9	1.5
5	1.1	3.6
6	2.6	7.7
7	0.3	1.1
8	1.0	2.2
9	0.6	1.0
10	0.8	1.6
11	3.5	5.6
12	1.4	8.0
13	7.3	10.8

Source: "Statewide Outdoor Recreation Plan" 1966, Pennsylvania State Planning Board

MAP 24

STATE PARK ANNUAL ATTENDANCE PROJECTION - 1980

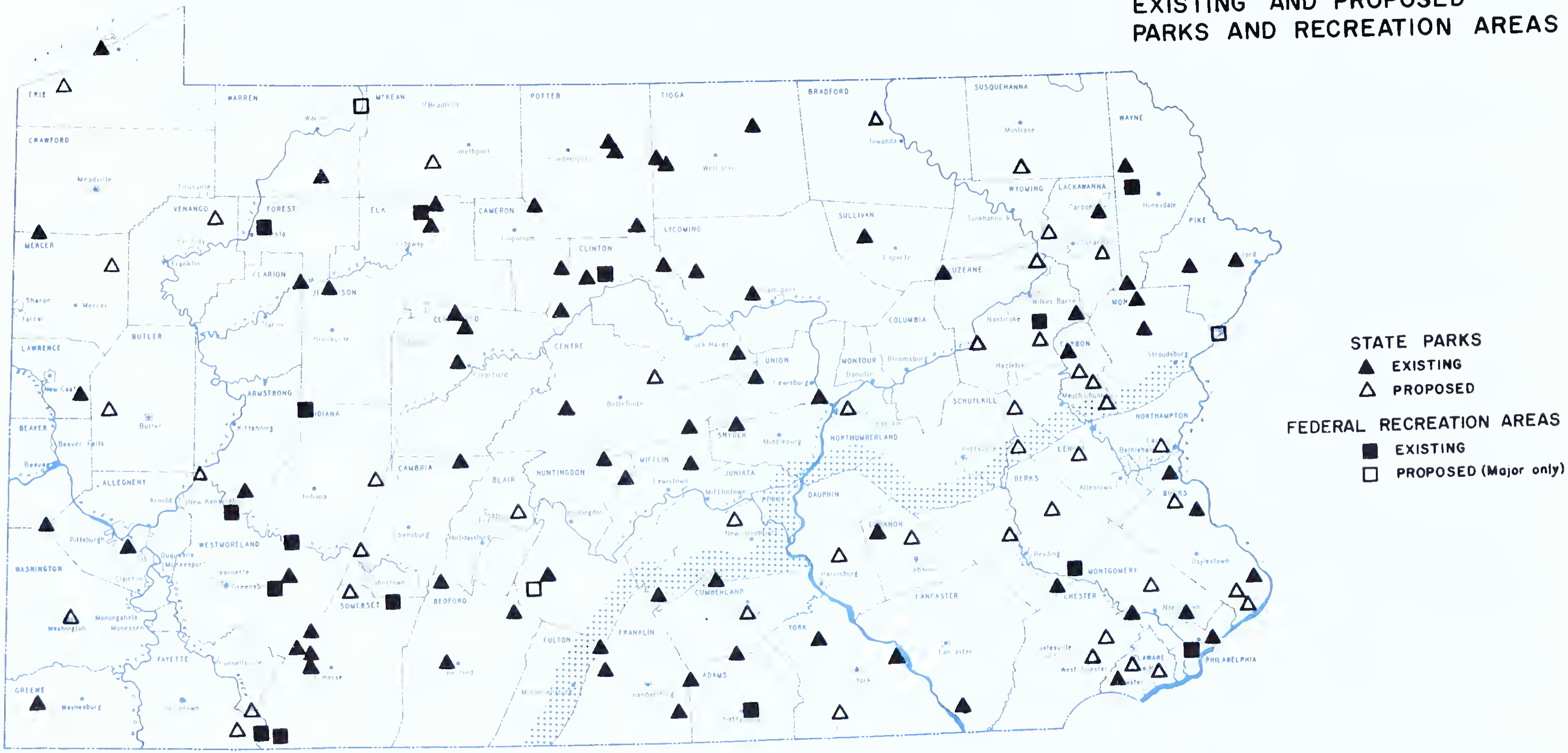
BY STATE PLANNING BOARD REGIONS



PENNSYLVANIA STATE PLANNING BOARD REGION

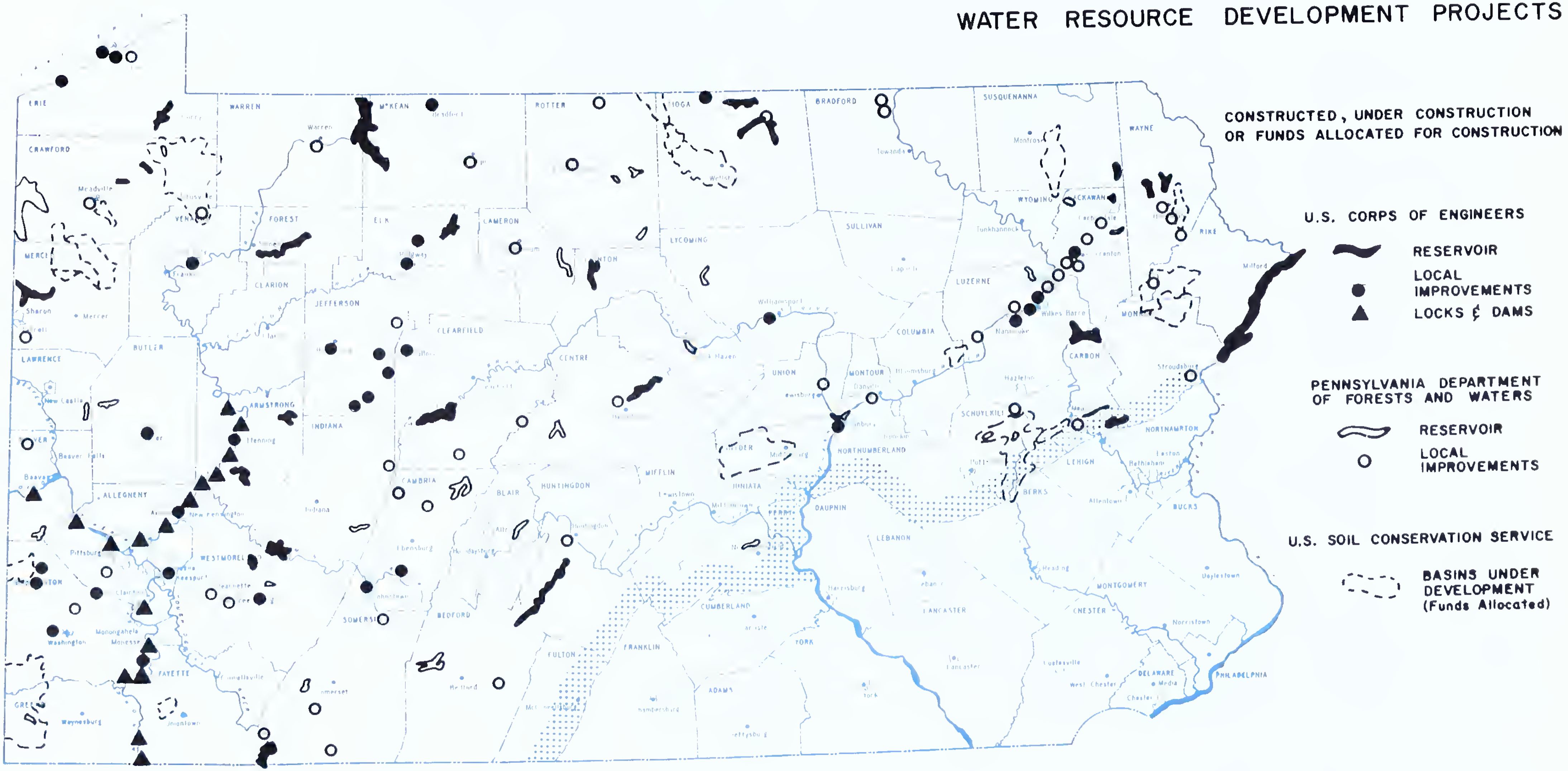
MAP 25

EXISTING AND PROPOSED PARKS AND RECREATION AREAS



MAP 26

WATER RESOURCE DEVELOPMENT PROJECTS



deficiencies" totaled 50 inches in a five-year period. This condition led the Delaware River Basin Commission to reevaluate estimates of "dependable yields" for the entire basin because of the importance of this water supply source to Philadelphia, New York City and users in the basin.

In other river basins the same is true except that acid water and municipal pollution often preclude the use of these supplies. Such conditions occasionally make water supply a prime justification for undertaking projects. (Among the 230 Appalachia water projects proposed by State agencies and localities, 83 would provide increased water supplies).

Multiple-Purpose Water Resources Development

Combined efforts to achieve water quality control, prevent flooding, promote recreation, improve opportunities for industrial development and achieve the numerous other objectives of water resources development are exemplified in Map 26 which shows projects built, under construction or recently funded. (Appendix D lists these projects by county). They are evidence that proper development of this resource has been a recurring objective of both the State and Federal governments despite the needs of today.

These projects also illustrate the many objectives that can be achieved in a single project -- an achievement with direct bearing on the Appalachian Development Program. This program is also based on the multiple-purpose approach in that it seeks to promote water resource projects needed by communities which will buoy their economies as well.

APPALACHIA PENNSYLVANIA WATER RESOURCES POLICIES

Planning policies for water resources in Appalachia Pennsylvania derive directly from concerns for growth and development of the State which will be necessary to insure the economic and social welfare of the people. From a general viewpoint the chief water problems which threaten the well-being of the people and the growth of the economy are those of seriously deteriorated water quality, flooding and insufficient water supplies.

CRITERIA

To deal with these problems most effectively a program of conservation, development and utilization of water and related land resources on a comprehensive, coordinated basis is implicit. As an operational principle it is, of course, necessary that all types of major water resources needs be considered. Among these are:

1. Adequate supplies of surface and ground waters of suitable quality for domestic, municipal, agricultural and industrial uses;
2. Water quality facilities and controls to assure continued supplies of water for these purposes;
3. Navigation improvements;
4. Hydroelectric power production;
5. Flood damage control measures;
6. Land stabilization programs;
7. Drainage and land reclamation proposals;

8. Watershed management and protection measures;
9. Fish and wildlife propagation; and
10. Outdoor recreation and education proposals.

(Information on each of these subjects -- existing studies, reports, maps, etc., that have been accumulated by various State and Federal agencies -- was assembled. A questionnaire was sent to each of the counties in the Appalachian Local Development Districts soliciting supplemental information about water resources problems).

A second operational principle emerges from the economic development thrust of the Appalachian Regional Act. It is that projects should be proposed in this Supplement which will solve or contribute to the solution of those problems which stand most in the way of development, contribute most to the release of development potentialities, and are regarded as having primary importance and urgency.

Among the social and economic development considerations that were weighed were the degree to which the project would:

1. Increase the production of goods and services within the region;
2. Expand other economic and business opportunities;
3. Enhance the welfare of the people in the region;
4. Broaden employment opportunities;
5. Raise the level of average income;
6. Raise the living standards; and
7. Increase productivity.

(To achieve this second objective over 230 proposals submitted by Federal, State and local agencies were examined in light of these seven points; from this process emerged the 17 top priority projects recommended in this report).

A third operational principle was the implicit understanding that this Supplement would be a synthesis of experts' opinions in both the descriptions of conditions and in recommendations for action. Thus, the work of others was brought together in a general fashion to convey the size of problems or opportunities; more detailed explanation of these matters is correctly the function of the agency administering the program.

Perhaps the most remarkable aspect of this effort at synthesis occurred in proposing recommendations for action -- not that it is unusual for experts concerned with a problem like acid pollution to agree upon the three or six most crucial projects. It is noteworthy, however, that experts from different fields concerned with flood control, recreation, waterfowl propagation, economic development, etc., agree on priorities among all these fields. In effect, this agreement substitutes for a scale of weights that might otherwise have been attempted for evaluating the merits of proposed projects. When such unanimity can be achieved among experts, there is, of course, little reason for attempting to devise such a weighting procedure.

Thus, the projects recommended below are the unanimous view of experts from the Department of Mines and Mineral Industries, Department of Health, Department of Highways, Department of Community Affairs, Fish Commission, Game Commission, Department of Agriculture, Department of Forests and Waters and Department of Commerce.

RECOMMENDED PROJECTS

The following chart names and summarizes salient features of the seventeen water resources development emergency and top priority projects proposed by the Commonwealth of Pennsylvania for inclusion in the "Report for Development of Water Resources in Appalachia." These seventeen projects are shown on a Statewide basis on Map 27. In addition, a separate map of each project is included with the detailed project descriptions.

RECOMMENDED PROJECTS

Name of Project and Location	Functions								
	Flood Control (1)	Recreation Development (2)	Recreation Enhancement (3)	Water Supply (4)	Water Quality (5)	Conservation and Wildlife (6)	Port Improvement (7)	Land Restoration and Reclamation (8)	Education (9)
A. Lackawanna River and Susquehanna River Emergency Project, North Branch Susquehanna and Lackawanna River Basins	X[*]		X		X	X		X	
B. Sewickley Creek Watershed -- Flood Protection and Water Supply, Westmoreland County	X			X					
C. Otocsin Reservoir and Recreation Area, Clearfield County		X				X			
D. Sechler's Run Flood Protection, Montour County	X								
E. Clarion River Basin Mine Drainage Abatement, Clarion River Basin			X		X	X		X	

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* from ground water

RECOMMENDED PROJECTS (Continued)

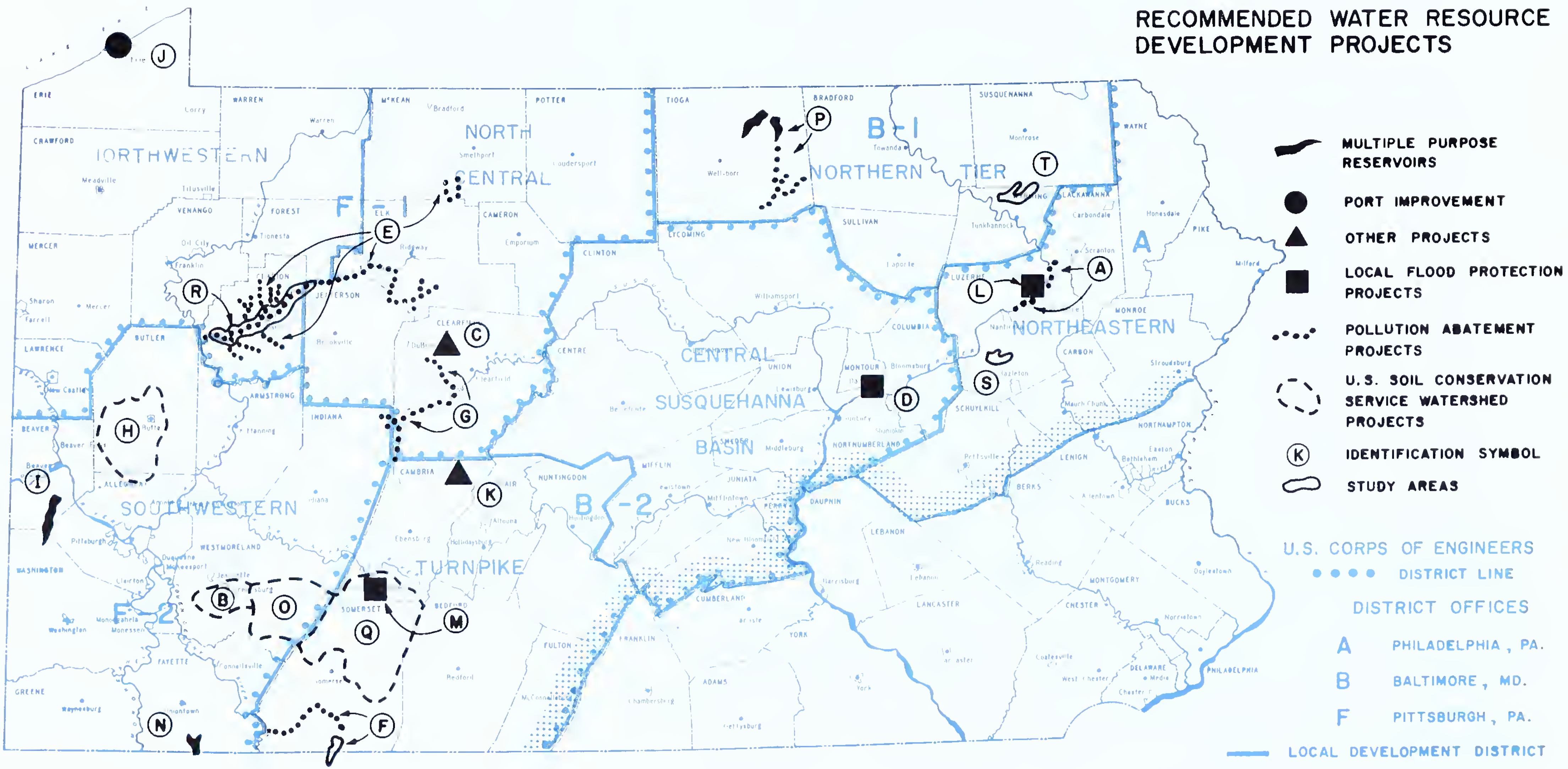
Name of Project and Location	(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)	(9)
F. Casselman River Mine Drainage Abatement, Casselman River (see note p.67)			X		X	X		X	
G. Upper West Branch Susquehanna River Mine Drainage Abatement, West Branch Susquehanna River Basin			X		X	X		X	
H. Connoquenessing Creek Watershed -- Flood Control, Water Supply, Recreation, Butler County	X	X		X		X			
I. Raccoon Creek Reservoir, Beaver and Washington Counties	X	X		X	X	X		X	
J. Port of Erie Dredging, Erie County							X		
K. Naturealm Conservation -- Education Area, Cambria County						X			X

RECOMMENDED PROJECTS (Continued)

Name of Project and Location	(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)	(9)
L. Abrahams Creek Flood Protection, Luzerne County	X								
M. Sam's Run Flood Protection, Cambria County	X								
N. Big Sandy Creek Reservoir, Fayette County	X	X		X	X	X			
O. Upper Loyalhanna Creek Watershed -- Flood Control, Water Supply, Recreation, Westmoreland County	X	X		X		X			
P. Tioga-Hammond Reservoir and Mine Drainage Abatement, Tioga County	X	X			X	X			
Q. Stony Creek Watershed -- Flood Control and Recreation, Somerset County	X	X				X			

MAP 27

RECOMMENDED WATER RESOURCE DEVELOPMENT PROJECTS



Note: The Casselman River Project consists of two parts: mine drainage abatement in the Casselman River and further study of the U. S. Army Corps of Engineers proposed reservoir for the Upper Casselman River. The study should include further locational and engineering investigations of the Upper Casselman reservoir as a top priority water resources project. In addition, the following projects should also receive attention:

- further study of the construction of a multi-purpose reservoir proposed by the U. S. Army Corps of Engineers, on the Clarion River, near St. Petersburg in Clarion County, including the consideration of the total impact and effect of this reservoir;
- study of the proposed reservoir and recreation facility, U. S. Army Corps of Engineers, on Wapwallopen Creek, in Luzerne County;
- study of the proposed reservoir and recreation facility, U. S. Army Corps of Engineers, on Meshoppen Creek, in Wyoming County.

EMERGENCY PROJECT

A. Lackawanna River-Susquehanna River Mine Drainage Abatement, Subsidence Prevention and Flood Protection. The cessation of pumping which has prompted closing of anthracite mines in the Lackawanna and Wyoming Valleys is creating crisis conditions of disaster proportions as mines fill with water and threaten to flood low lying sections of Wilkes-Barre, Hanover Township, Jenkins Township, Pittston Township, Kingston and Edwardsville. In addition to flooding, subsidence is a serious hazard as mines fill and raise the water table to the level of some basements.

Intensified mine drainage pollution of the North Branch of the Susquehanna River has killed fish and aquatic life as far down the river as Danville. During the past two decades the acid load of the river has doubled although the total amount of water has remained about the same. Thus, the pollution problem has grown worse, a condition that has occurred along with closing of mines in both Lackawanna and Wyoming Valleys.

Technical explanations of the chain of events leading to today's crisis are found in two papers contained in the files of the Pennsylvania State Planning Board. The first, "Minutes of A Meeting Regarding The Consequences Of Cessation Of Pumping Operations By Blue Coal Corporation" discusses the consequences of cessation of pumping in the Wyoming Valley and the second, "Mine-Water Pools in the Northern Anthracite Field, Pennsylvania" by Wilbur T. Stuart, U. S.

Geologic Survey, describes the relationship of the mine-water pools in abandoned mines and the acid mine water in the anthracite area.

The extent of flooding and subsidence is impossible to determine ahead of time, but considerable danger is known to exist especially in the flood plain which lies generally below elevation of 540 feet. (See Map A-1). In addition, fractures in the overburden (through which water may breakout) exist in many parts of the Wyoming Valley. Where coal pillars have been robbed, these fractures are considered most likely to occur.

Data showing the rising water levels in mines are also included in Chart A. As pumping has ceased the ground water levels are rising close to the surface. These waters have been blamed for subsidence conditions in Plymouth after the Nottingham-Buttonwood Mine closed, basement flooding and minor subsidence in Kingston last summer, and the recent loss of two homes (and threat to two blocks of other homes) in the Austin Avenue area of Wilkes-Barre. Cessation of pumping by the Blue Coal Company will allow water to move freely through the Wyoming Valley flooding mines on both sides of the Susquehanna from Forty-Fort to Nanticoke.

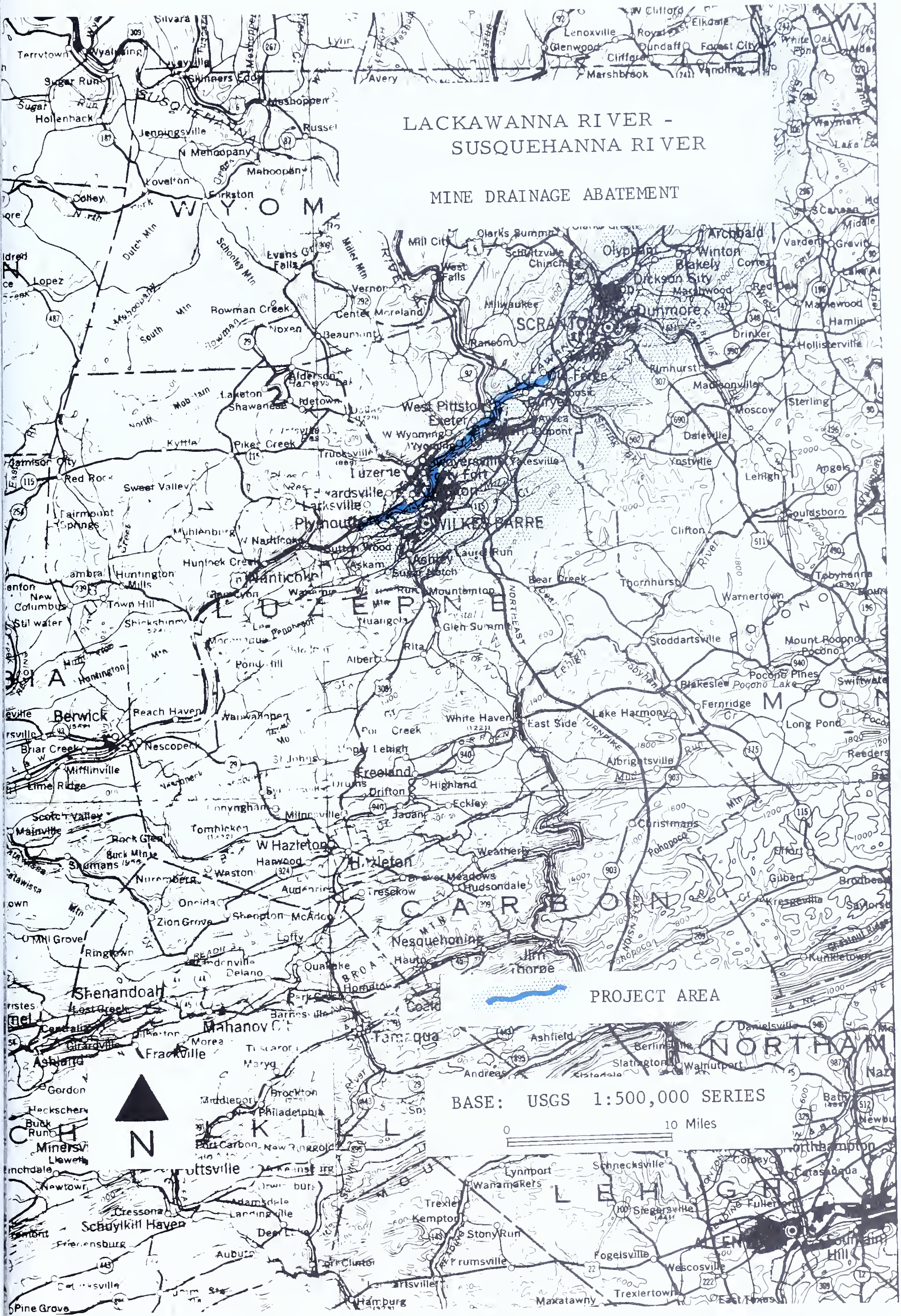
An estimated $68.2 million is required for boreholes, pumps, mine sealing and flushing, land reclamation and back filling necessary to curb these conditions. The project was singled out as an emergency by State agencies concerned with water resources because the combination of conditions could severely damage residential and industrial areas. Already the loss of 1,200 mining jobs has hit the local economy through cessation of pumping.

Economic Effects. Among the benefits of this project are the protection from flooding and subsidence of an undetermined number of homes and businesses in the 9.05 square miles in the flood plain of the densely settled Wyoming Valley.

Pumping and treatment of acid mine water in the Old Forge and Duryea areas of the Lackawanna Basin will remove 66 tons of acid and 31 tons of iron pollutants daily. Approximately equal amounts will be prevented from entering the North Branch system in the Wilkes-Barre area. Thus, almost 200 tons of pollutants daily would be kept from the river.

Once the water quality is improved, the North Branch of the Susquehanna will become useful for industrial and municipal needs. (The Federal Water Pollution Control Administration gave pollution abatement in the Berwick to Pittston section of the North Branch the highest number of "benefit points" indicating that the need is critical and action will be most beneficial.) The Scranton-Wilkes-Barre area has been selected as a primary growth potential center in Appalachia; further job losses from these mine flooding conditions could reverse this growth trend if subsidence should dislocate large employers.

The project should improve water used for the municipal supply in Danville and for processing by Merck and Company across the river from Danville, and downstream communities will beneift by being able to offer a higher grade of water to prospective industries. Water quality will be improved for cooling needs of the United Gas Improvement Company power plant at Hunlock Creek in Luzerne County.



LACKAWANNA RIVER - SUSQUEHANNA RIVER

MINE DRAINAGE ABATEMENT

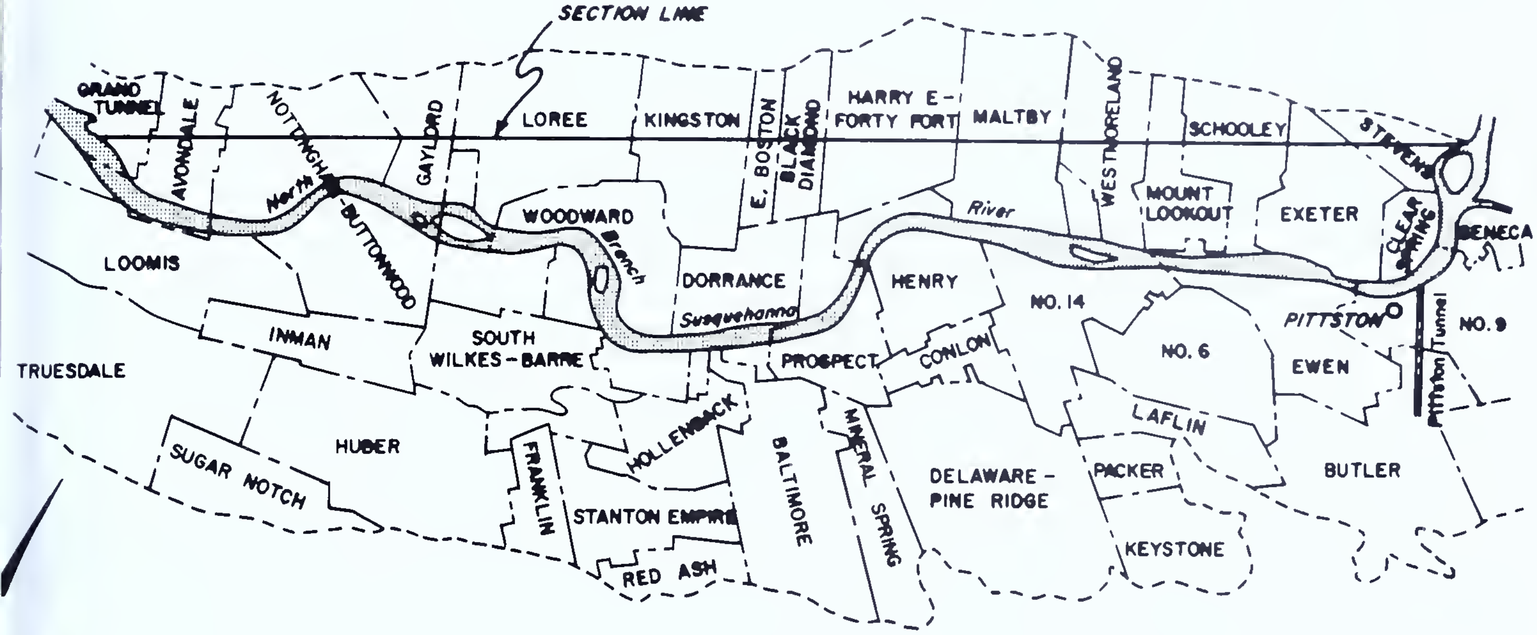
PROJECT AREA

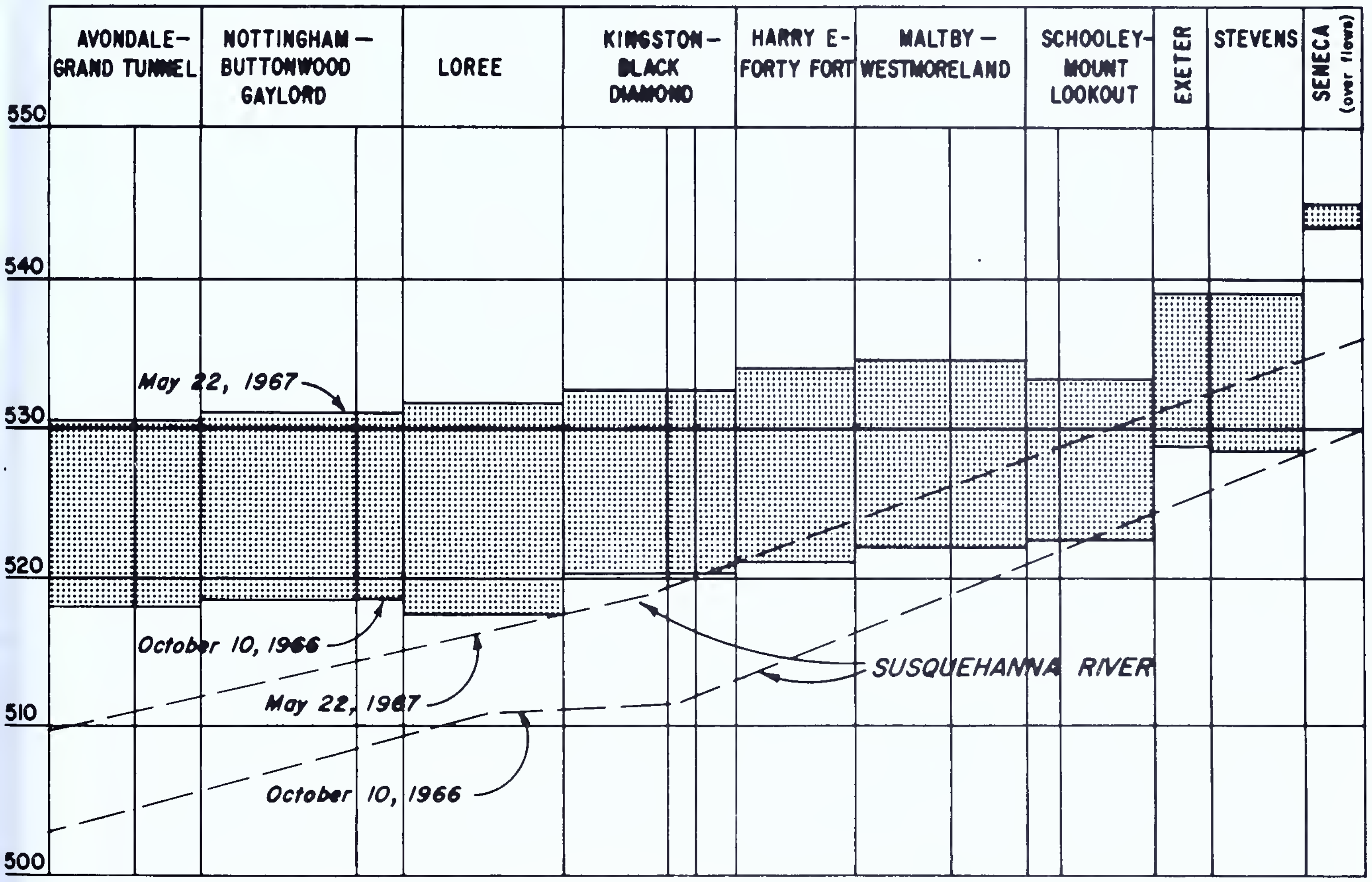
BASE: USGS 1:500,000 SERIES

0 10 Miles

CHART A

ANTHRACITE MINES IN WYOMING VALLEY



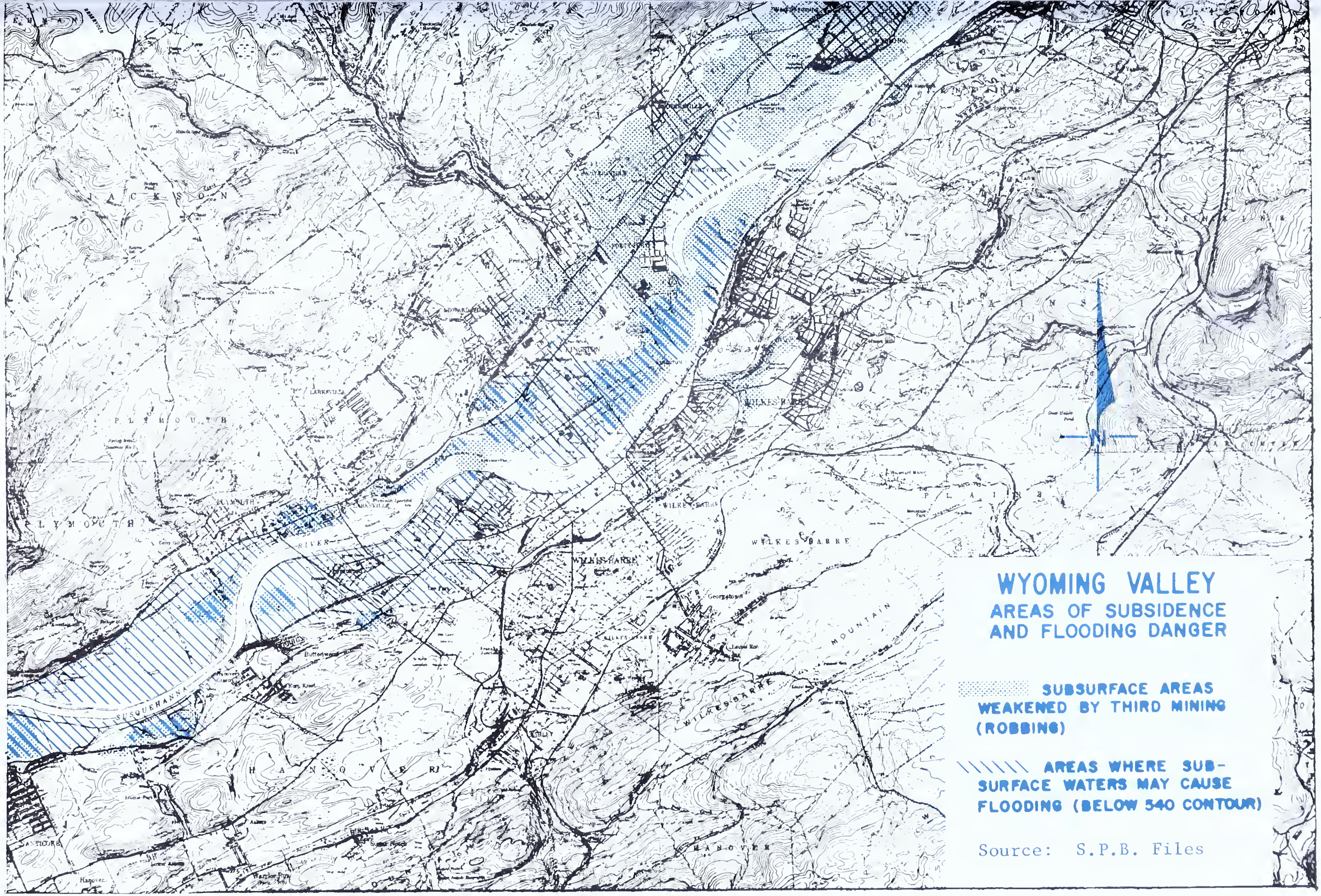


DIAGRAMMATIC SECTION THROUGH THE MINES ALONG THE NORTH SIDE OF THE WYOMING VALLEY SHOWING THE MINE-WATER POOLS FOR A HIGH AND LOW WATER LEVEL AND THE PROFILE OF THE SUSQUEHANNA RIVER AT THE CORRESPONDING TIME

Source: U. S. Geological Survey

LEGEND

▒	MINE POOL
— — —	SUSQUEHANNA RIVER



▒ SUBSURFACE AREAS WEAKENED BY THIRD MINING (ROBBING)
\\\\\\ AREAS WHERE SUBSURFACE WATERS MAY CAUSE FLOODING (BELOW 540 CONTOUR)
JACKSON
PLYMOUTH
LARKSVILLE
KINGSTON
SUSQUEHANNA
RIVER
WYOMING
WILKES-BARRE
PLAINS
MOUNTAIN
HANOVER
Georgetown
Buttonwood
SANTICOKE
Hanover

WYOMING VALLEY
AREAS OF SUBSIDENCE
AND FLOODING DANGER

Source: S.P.B. Files

Water of the North Branch basin will be more adaptable for fishing and wildlife propagation. Recreation opportunities, especially boating, will be enhanced, bringing business opportunities to serve the needs of boaters.

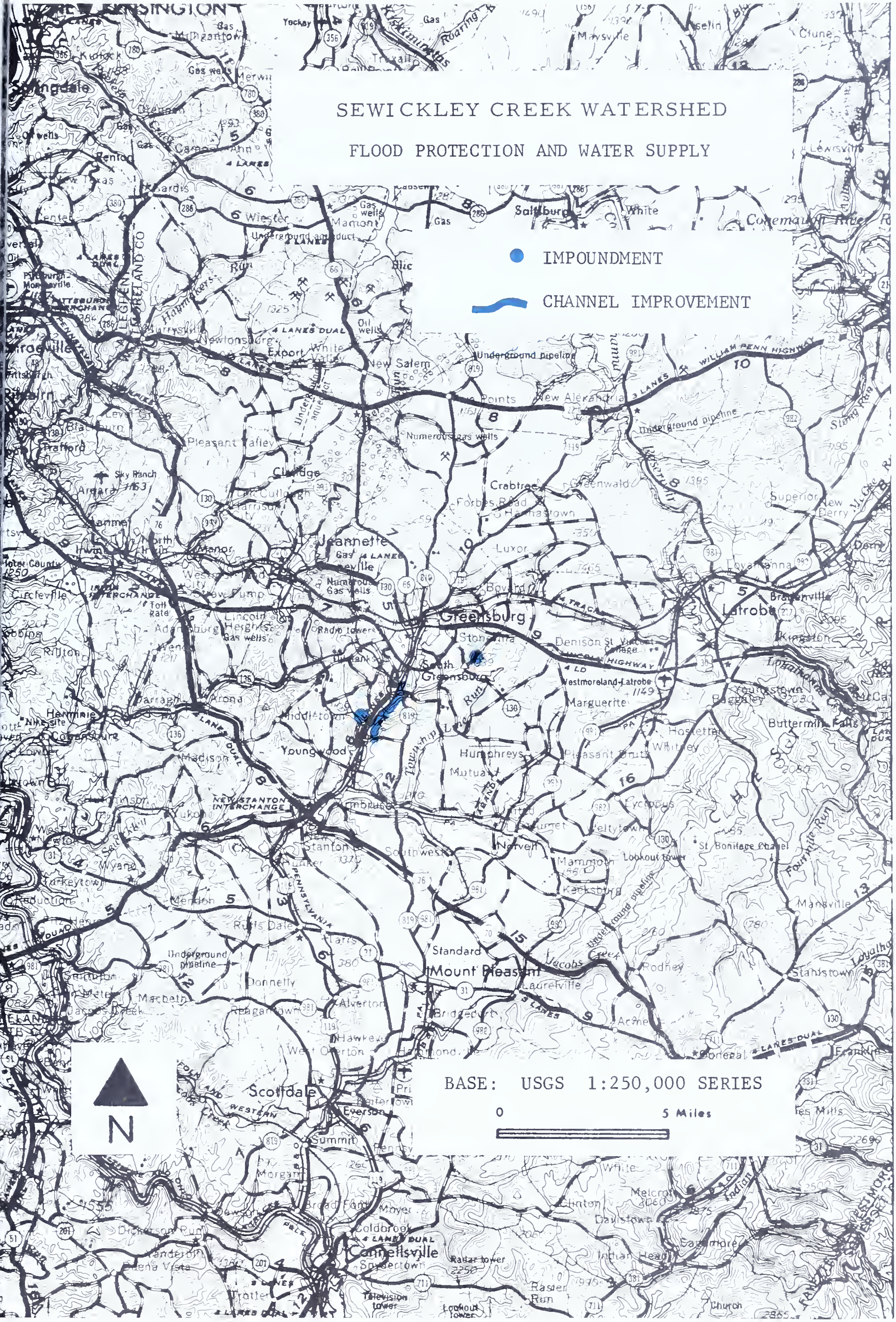
TOP PRIORITY PROJECTS

B. Sewickley Creek Watershed Flood Protection and Water Supply. Estimated annual flood damages in the Sewickley Creek Watershed (southwestern part of Westmoreland County) are $230,700. The bulk of this damage is incurred by factories between South Greensburg and Youngwood which is an area of both substantial industrial activity and potential for much more. The project consists of two proposed reservoirs on tributaries to Jack's Run (P.L. #566 Project). One can be used for flood control and industrial water supplies while the other will be of use for flood control. Water quality in both reservoirs will be good. Both will have some recreation potential. A 2.13 mile channel improvement through the Youngwood area is also required. Estimated cost is $3,528,800.

Economic Effects. The Borough of Youngwood (1960 population 2,813) would have protection from the 100-year design flood. Existing industries would be protected and 100 acres of land would be made available for development. A creek basin of 166 square miles which contained 67,700 people in 1960 will be protected. Westmoreland County is identified as a primary growth potential area by the Plan For Public Investment in Appalachia.

SEWICKLEY CREEK WATERSHED

FLOOD PROTECTION AND WATER SUPPLY

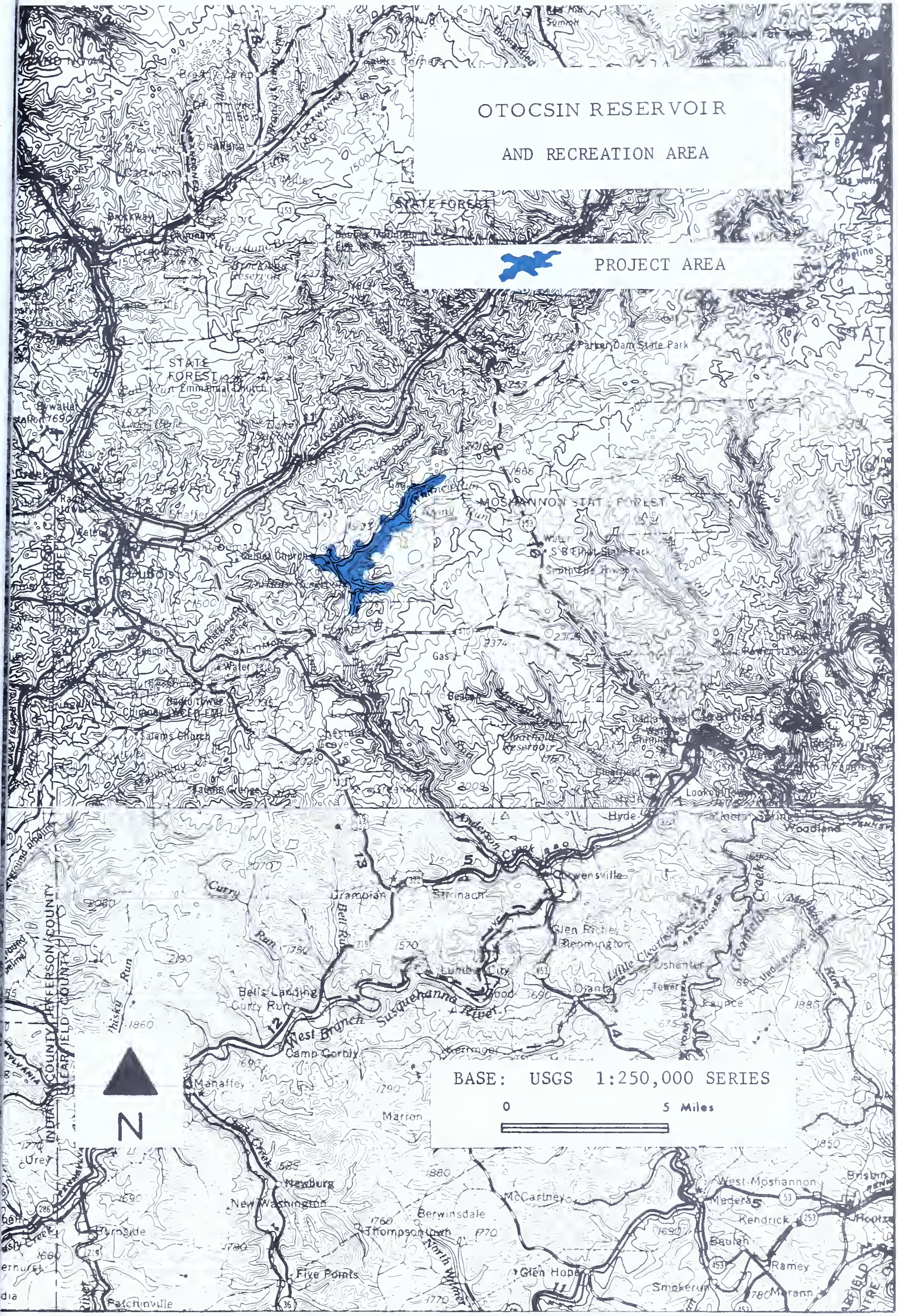


C. Otocsin Reservoir and Recreation Area. Construction of Interstate Highway #80 across the length of Pennsylvania is opening large sections of mountainous country for recreation use. Among the opportunities for development, one of the finest is Lake Otocsin, a proposed 1400-acre lake on Anderson Creek in Clearfield County, which is 4½ miles from the Elliott Interchange. Estimated cost for the reservoir is $3 million. This is the first step in an overall plan of public and private investment in lodge, motel, camping and commercial facilities estimated to cost $29 million ($11 million public investment). The reservoir will serve recreational needs, provide water supply and be the beginning portion of a fish and wildlife propagation program. (At nearby Mosquito Creek, the Fish Commission plans to develop a rearing pond to stock the area's streams.) The Otocsin project is to be coordinated with the City of DuBois by the Department of Forests and Waters.

Lake Otocsin is the first of several lakes of 10 to 30 acres envisioned for this area. Situated on the short route from New York to Chicago, Otocsin is considered to be in a strategic location for attracting campers, sportsmen and students. In addition to commercial facilities for food and lodging, the plan calls for development of a golf course, narrow gauge railroad, art center (outdoor theatre, a playhouse, an art and music instruction building) and wildlife park, children's zoo and fantasy forest.

Economic Effects. When completed, estimates suggest 50,000 visitors daily for four months, spending approximately $200,000 daily, and during the remainder of the year the daily spending is estimated at $25,000 for an annual gross of $30,000,000. Translated into employment this would result in 950 (annual equivalent) jobs with a payroll estimated at $9.8 million annually. Another 950 jobs in service industries are expected to result as well.

For the economy of Clearfield County this development promises to be an important economic stimulant which will replace jobs lost during the mechanization of bituminous coal mining. (Declining labor requirements are particularly apparent in strip mining which requires about one-third less labor. Clearfield County leads Pennsylvania in strip mine production.) Unemployment rates in the County exceed the State average. In 1962: Pennsylvania 7.8%; Clearfield 11.9%. In 1966: Pennsylvania 3.4%; Clearfield 5.4%.



OTOCSIN RESERVOIR

AND RECREATION AREA

🟦 PROJECT AREA

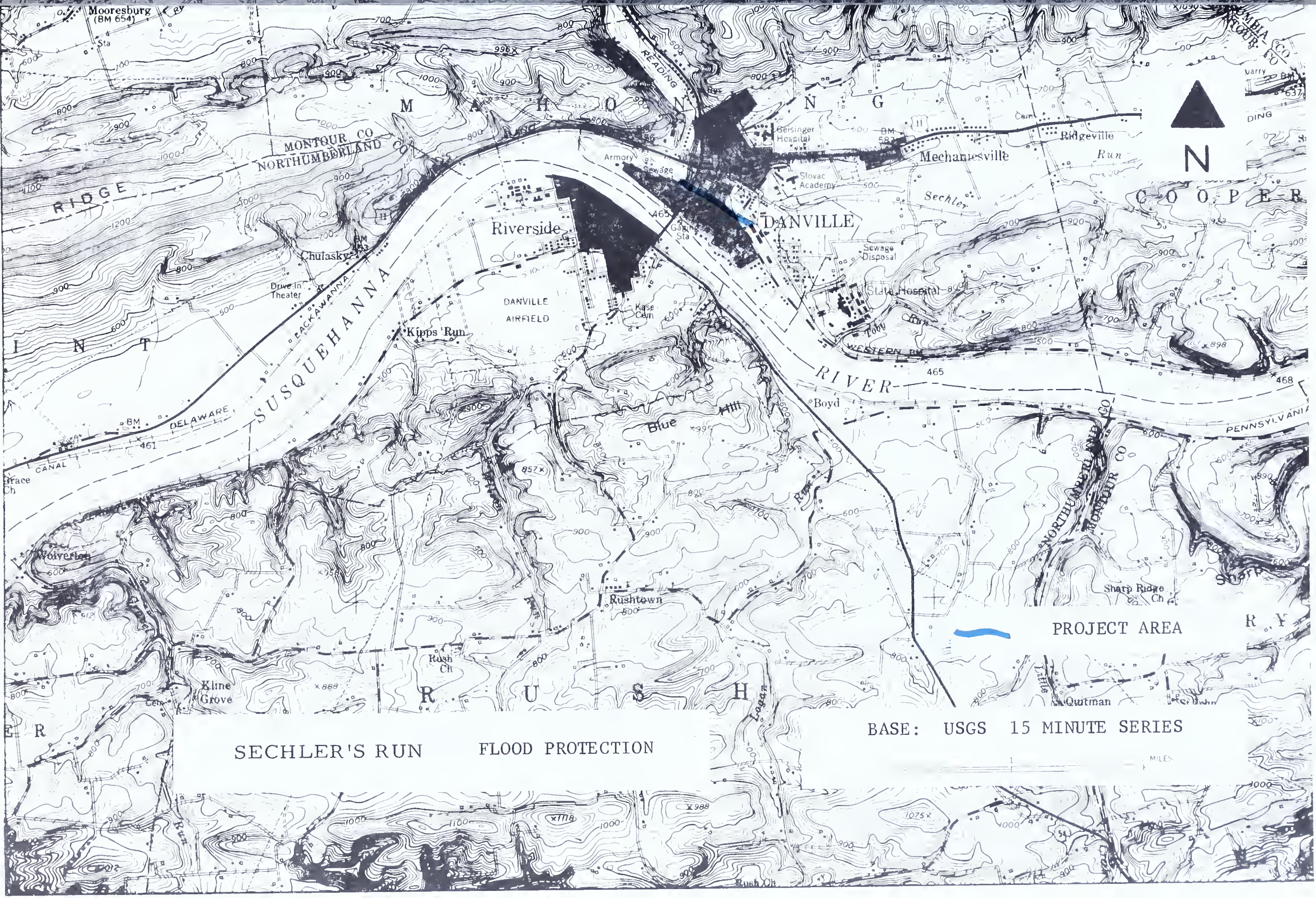
BASE: USGS 1:250,000 SERIES

D. Sechler's Run Flood Protection. The Borough of Danville has suffered extensive flood damages from both high stages on the Susquehanna River and heavy runoff in the watersheds which drain through the town in Sechler Run and Mahoning Creek. A 1957 study by the Corps of Engineers reported annual flood damages to Danville equivalent to $360,000 (current prices). In 1958, Sechler Run was dredged. Currently, a levee is under construction along the Susquehanna, engineered by the Department of Forests and Waters. However, flood waters have backed up into the Danville business district on the average of once every two years for the past six decades.

The proposed project will close the gap of Sechler's Run in time of high water on the Susquehanna and thereby protect the large industries within the Borough which have suffered costly shut-downs from flooding. (Danville, Montour County seat, had 2,188 manufacturing employees in 1965, most of whom work in the affected flood plain).

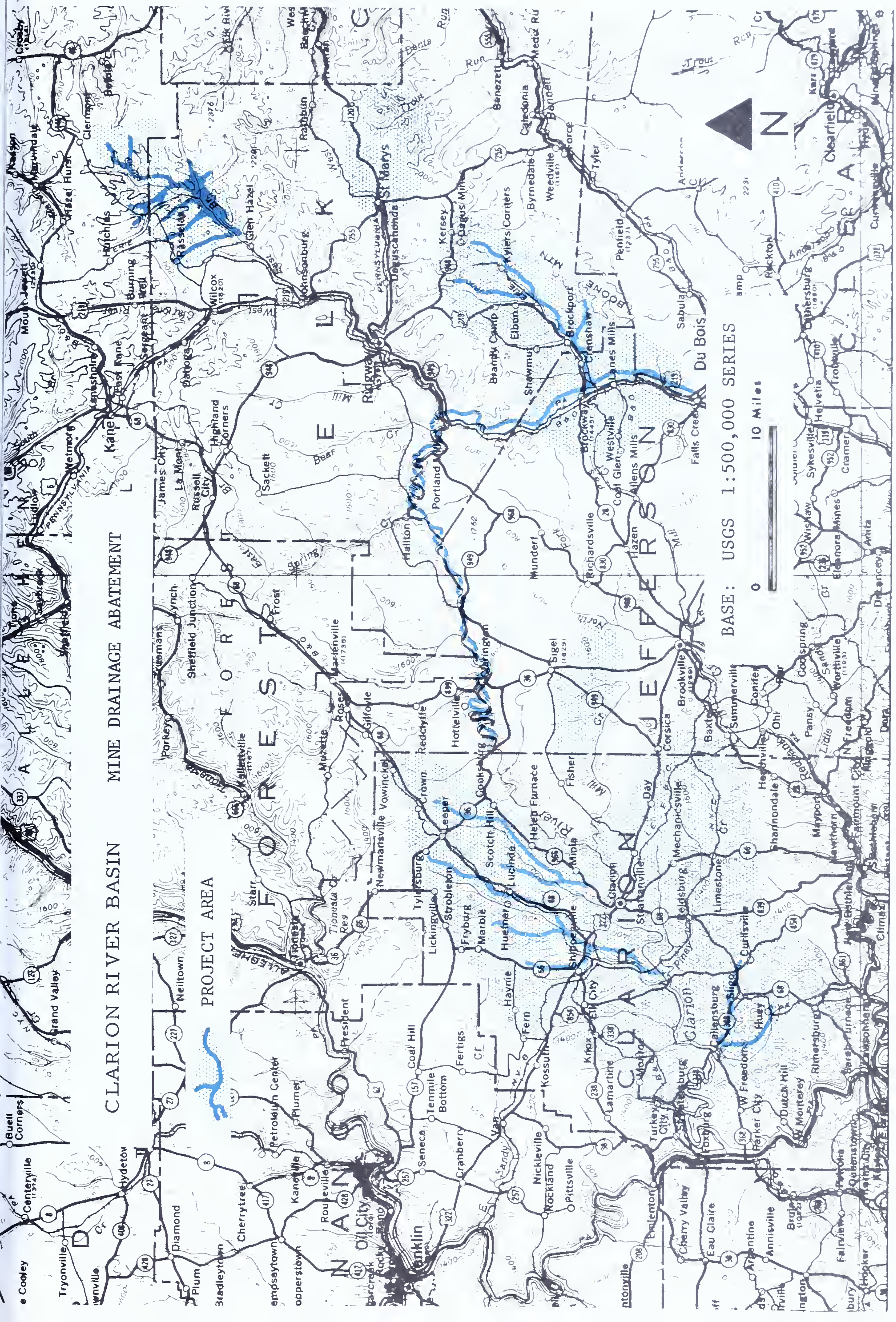
The project consists of 2,400 feet of channel improvement with levees and/or floodwalls, 1,200 feet of concrete-lined channel, 800 feet of pressure culvert, a pumping station and an interior drainage collection system. It is estimated to cost $1,150,000 with a benefit-cost ratio of 3 to 1. Most significantly, it will complete the program of flood protection for Danville.

Economic Effects. Protection of existing industries is the most important aspect of this project, especially since the business and industrial area of Danville is flooded so often. Not only should existing employers feel greater safety in their plant locations, but the Borough should be enhanced for expansion of existing businesses and be more attractive to prospective employers.


SECHLER'S RUN FLOOD PROTECTION

BASE: USGS 15 MINUTE SERIES

PROJECT AREA



CLARION RIVER BASIN MINE DRAINAGE ABATEMENT

PROJECT AREA

BASE: USGS 1:500,000 SERIES

E. Clarion River Basin Mine Drainage Abatement. The Clarion River Basin, from McKean County to its mouth at the Allegheny River in Clarion County, suffers from mine acid pollution in varying degrees of severity. Throughout the basin bituminous coal mining, especially strip mining, is prominent and has contributed to Clarion County's present water supply problems. Both surface and ground waters are affected by mine drainage, thereby inhibiting economic development that requires large supplies of clean water.

Aquatic life cannot live in many of the tributaries such as Toby, Piney, Deer and Licking Creeks and Cherry Run. An existing reservoir on the East Branch of the Clarion River will continue to suffer from contamination unless this project is undertaken.

The project will consist of reclamation of strip mine area, mine sealing and grouting, and surface water diversion and treatment, and is expected to cost $60 million.

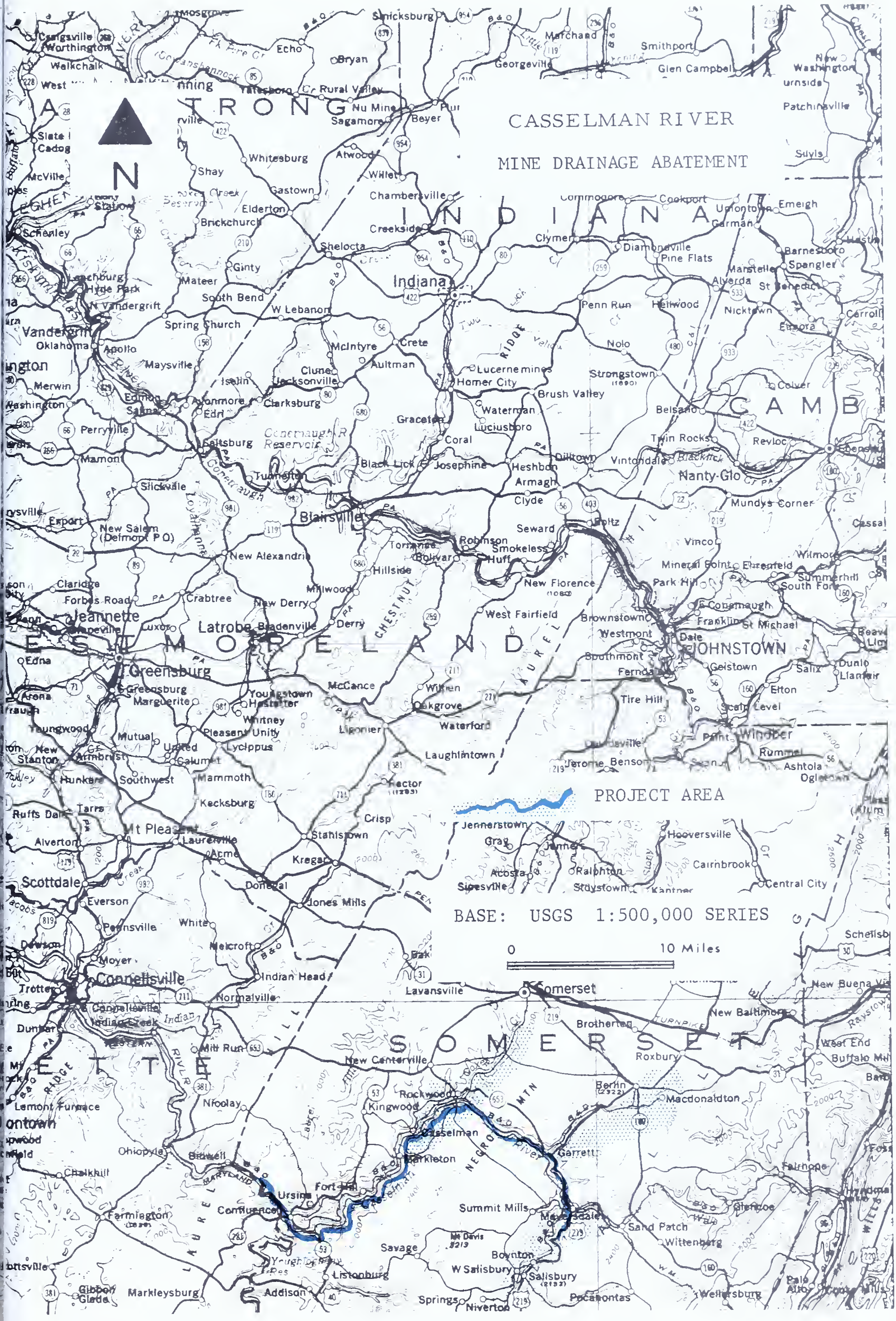
Economic Effects. The project will stop entry of 55 tons of acid daily into the Clarion and its tributaries, resulting in reduced processing costs to municipalities and industries. A paper mill at Johnsonburg, for example, would no longer need to neutralize water before using it. Land stabilization and watershed protection to agriculture and woodland in the Clarion Basin will result. Recreation (which currently amounts to 100,000 visitor days per year) will be enhanced through water quality improvement especially as the streams become able to support fish again.

F. Casselman River Mine Drainage Abatement. The Casselman River, which drains much of southern Somerset County, is the major source of mine drainage pollution in the Upper Youghiogheny River (a tributary of the Monongahela). Abatement work in this basin is the first step required to restore fish and other aquatic life to the Casselman and Youghiogheny Rivers. It will consist of reclamation of strip mine areas, mine sealing and grouting, and surface water diversion and treatment. Cost estimates range from $5 to $7 million.

Economic Effects. Improved water quality in the Casselman will reduce water treatment costs for downstream water companies, i.e., Connellsville Water Company serving 20,000 people, North Fayette County Municipal Authority (5,000), McKeesport Municipal Water Works (70,000) and the Elizabeth Township Water Company (10,000). Likewise treatment costs for industries along the Monongahela will be reduced.

The recreational benefits will begin with restoration of fish and other aquatic life in the Casselman River, but of equal importance will be the protection of water quality in the Ohiopyle State Park.

Study and Analysis of U. S. Army Corps of Engineers Upper Casselman River multiple-purpose reservoir proposal. This planning project of a proposed reservoir is for investigation of the effects of a reservoir intended to provide flood control, low flow augmentation, conservation and recreation, etc., in the Casselman basin.



CASSELMAN RIVER

MINE DRAINAGE ABATEMENT

PROJECT AREA

BASE: USGS 1:500,000 SERIES

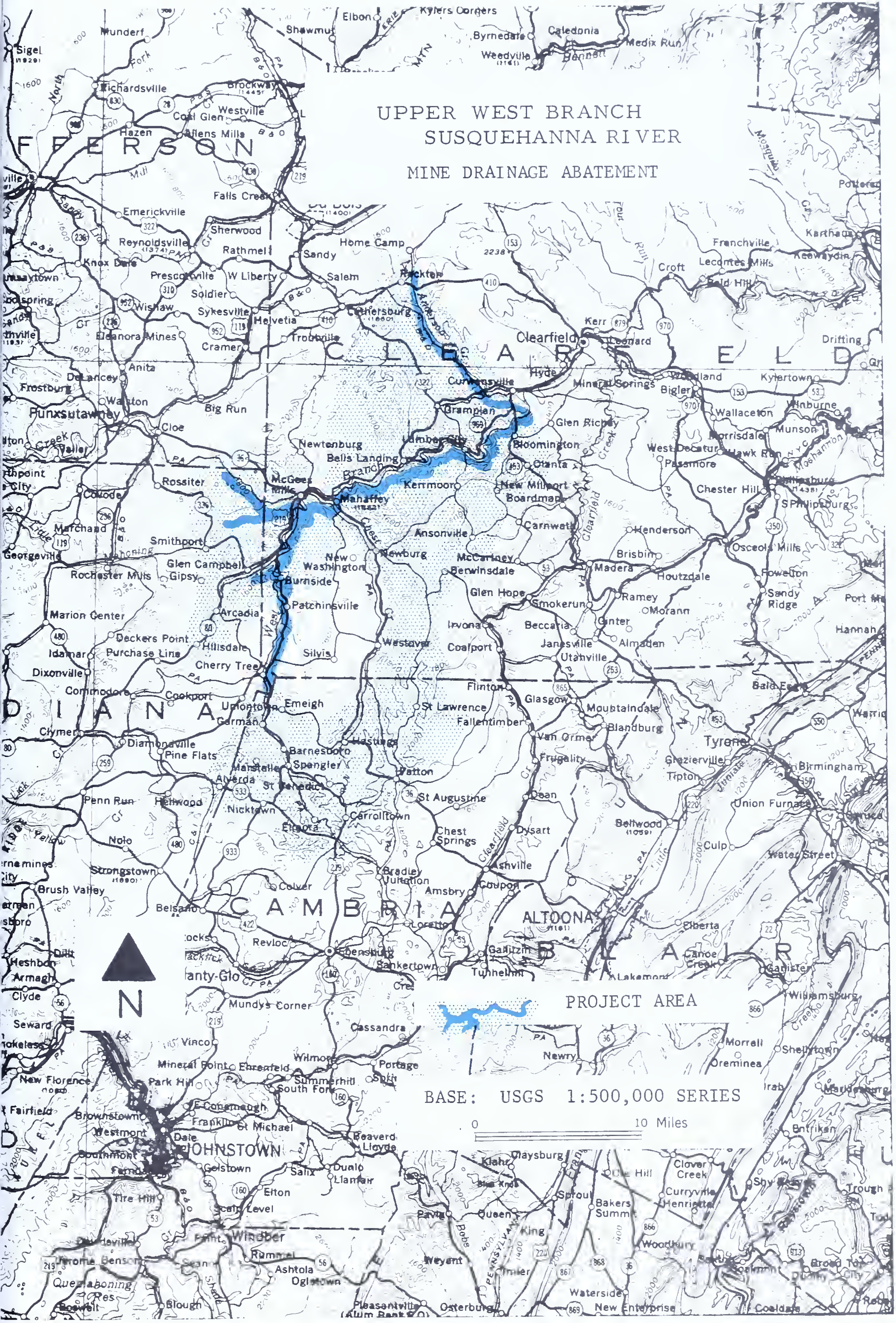
0 10 Miles

G. Upper West Branch Susquehanna River Mine Drainage Abatement. The upper reaches of the West Branch of the Susquehanna are acid impregnated because of past bituminous mining activity in Clearfield and Cambria Counties. The first step in the overall improvement of the West Branch is abatement of mine acid pollution above Curwensville in central Clearfield County. The basin in which these headwaters are found is approximately a tenth of the total West Branch drainage basin (3,337 square miles), and should be undertaken first to achieve the greatest benefits downstream.

The project calls for backfilling and reclamation of strip mine areas (Clearfield leads the State in acres of unreclaimed strip mines), mine sealing and grouting, drainage flow control, diversion channels and treatment. The pollution load of the Basin where the project is to be undertaken averages between 300,000 and 450,000 pounds of acid daily, all of which is to be removed through this estimated $7.7 million undertaking.

Economic Effects. The Corps of Engineers Curwensville Dam has created a lake around which the Department of Forests and Waters has established Curwensville State Park. The park had 62,311 visitors in 1967, a relatively small number which is readily explained by adverse water quality. Only boating and picnicking facilities have so far been developed because the lake is acid and unsuitable for supporting quantities of aquatic life. And the water is mildly irritating to the eyes when used for swimming. An immediate and important effect to Clearfield County (which has suffered employment losses from the decline of mining) will be the expansion of recreation based businesses.

A long-term benefit to industrial water users downstream will result as the benefits of this project are coupled with similar efforts in the lower tributaries of the West Branch.



UPPER WEST BRANCH SUSQUEHANNA RIVER MINE DRAINAGE ABATEMENT

PROJECT AREA

BASE: USGS 1:500,000 SERIES

H. Connoquenessing Creek Watershed - Flood Control, Water Supply and Recreation. Connoquenessing Creek Basin in Butler and Allegheny Counties covers 77,000 acres and flows through the communities of Butler, Renfrew, Harmony and Zelienople. It and its tributaries have been responsible for flooding in Zelienople, Harmony, Evans City and the north side of Butler. Total estimated flood damages are $382,400 annually. Water quality is generally good although there is some mine drainage from extensive strip mining. There are more than 100 industrial establishments between Butler and Zelienople employing more than 10,000 people.

This project calls for construction of 21 structures to impound 3,000 acres of water and protect 147 square miles of the watershed. (P.L. #566 Project). It will cost an estimated $14,637,300 and provide flood control, recreation, water supply, land restoration and reclamation and enhancement of wildlife.

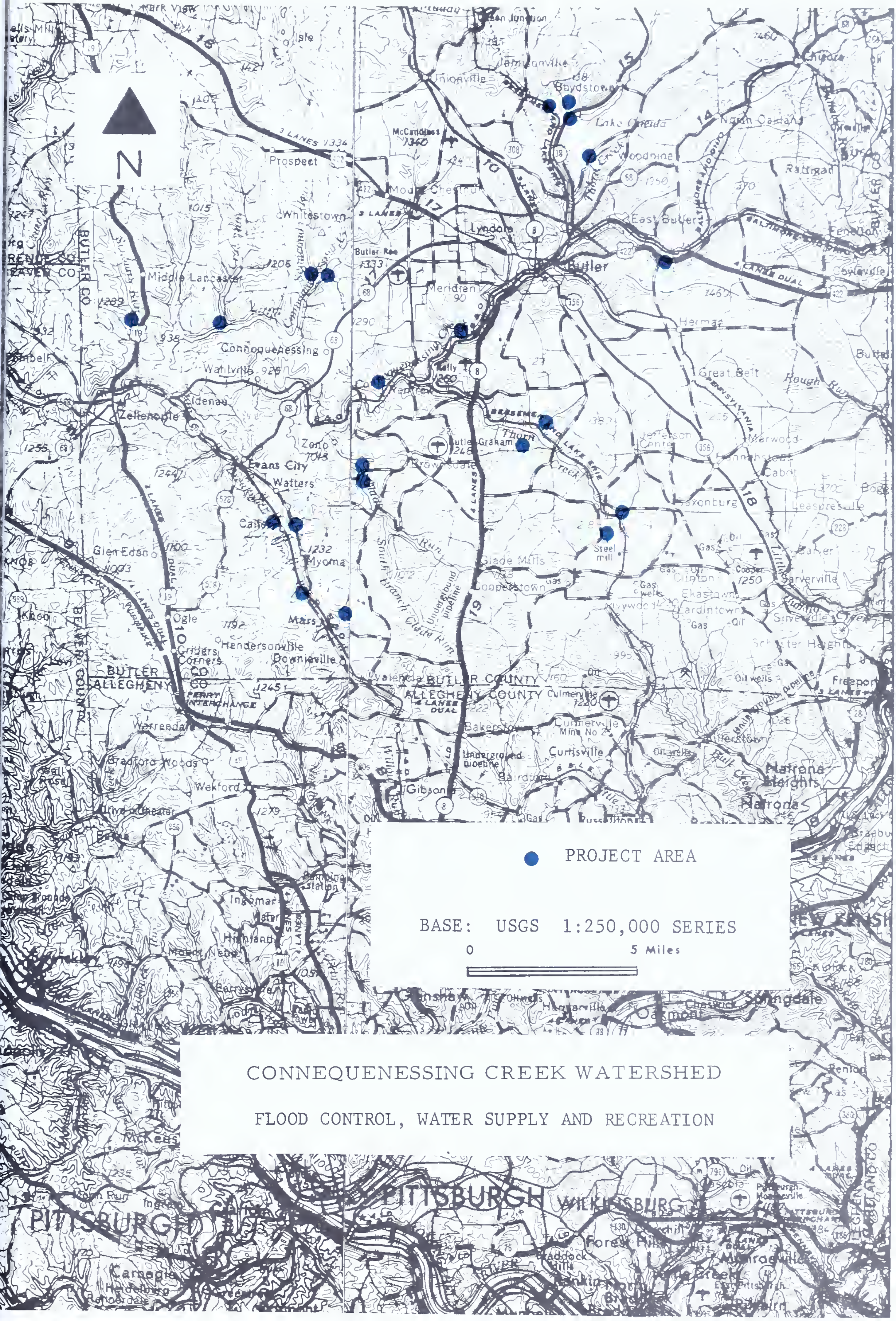
Economic Effects. Flood prevention benefits are estimated to be $228,900 annually including 94% protection to Zelienople and Harmony, 82% to Evans City and 75% to the north side of Butler City.

Recreation benefits are estimated to be $598,600. Three potential structures chosen to include recreation development could provide 420,000 visitor days annually.

Redevelopment benefits including employment of construction and maintenance people are estimated to be $98,700 annually. Another $269,000 will result from expanded business activity.

The project will tend to complement the establishment of two State parks currently planned by the Department of Forests and Waters in the watershed, and it will partially fill the large recreation need for boating areas in the Southwestern Development District.

Butler (population 20,000) which draws part of its water supply from the Allegheny River 30 miles away at East Brady would be able to meet its expanding urban and industrial demands from reservoirs to be built in the watershed. (Currently, the City draws about 3½ million gallons daily from the Allegheny River for about 2½ months to augment the supply of its nearby reservoirs.)



CONNEQUENESSING CREEK WATERSHED

FLOOD CONTROL, WATER SUPPLY AND RECREATION

I. Raccoon Creek Reservoir. Raccoon Creek, a tributary of the Ohio River, drains a 147 square mile basin in Washington and Beaver Counties. The reservoir proposed by the Corps of Engineers will abut the popular Raccoon State Park and contribute expanded water recreational facilities to the Southwestern Development District.

This $35 million project includes construction and acquisition of a 3,660 acre reservoir, and abatement of acid runoff from abandoned bituminous mines. It will provide flood control, improved water quality and water supply sources.

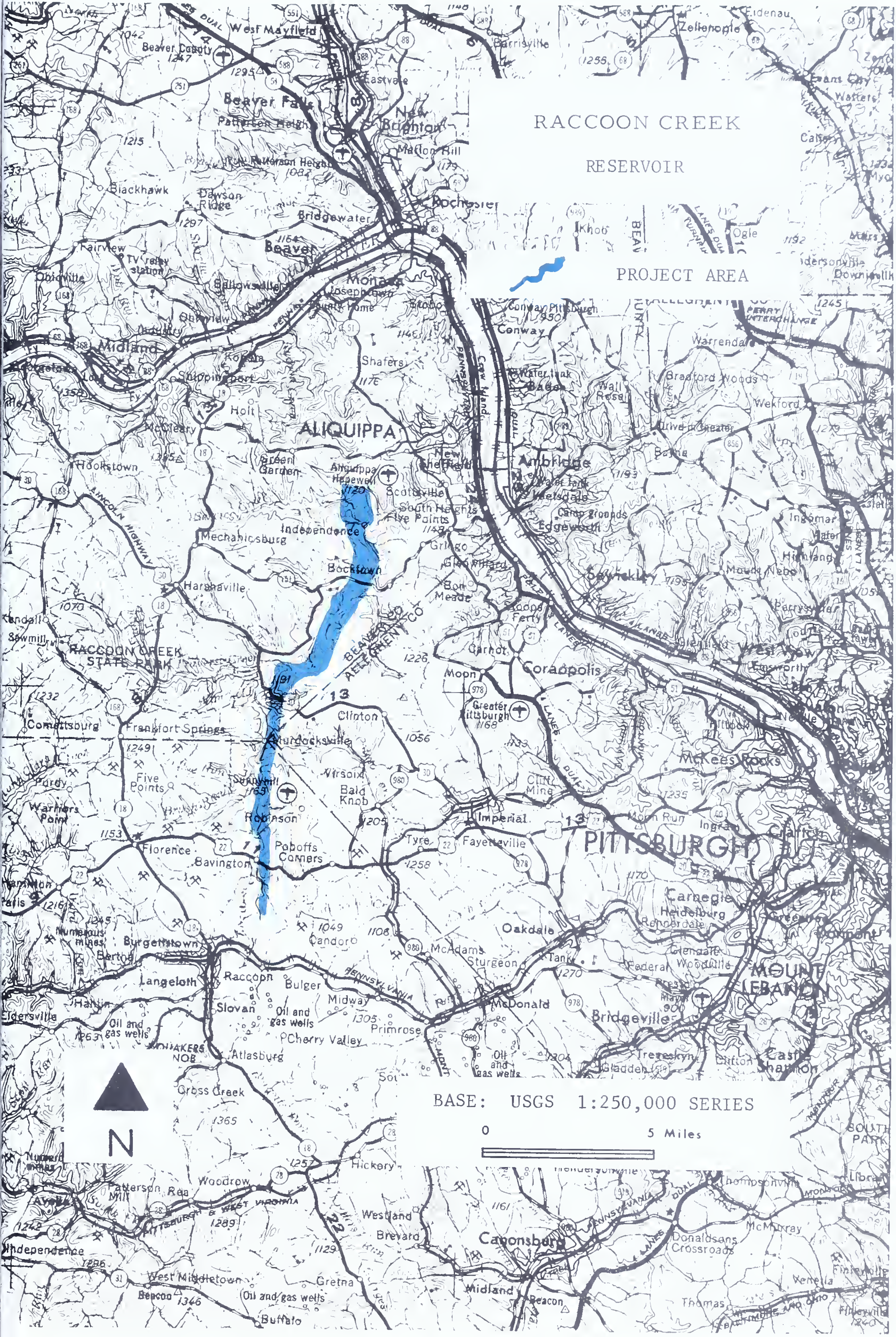
The dam site is nine miles above the Ohio and a few miles north of the authorized Harmon Creek Watershed project in Washington County which is being undertaken for flood control, recreation, water quality and other reasons.

Economic Effects. Flood benefits will be limited to a six-mile long flood plain immediately below the dam site, and reservoir storage of only three inches of flood control storage can be provided because of the short length of stream to be protected.

Water supply from the reservoir can be extremely valuable to nearby urban and industrial development along the Ohio River. (Aliquippa, population 24,000 is adjacent to the creek Basin.)

Mine acid abatement work that will be part of this project is needed to eliminate the present acid impregnation which prevents growth of aquatic life, recreation use or water supply development.

Once completed this project will make possible an attractive recreation area for use by the metropolitan Pittsburgh population, and return the Basin's water to conditions that will support fish and other aquatic life.



RACCOON CREEK RESERVOIR

J. Port of Erie Dredging. Two recent events have injected new life into the Port of Erie, Pennsylvania's only port on the Great Lakes. The first was the completion of the St. Lawrence Seaway which opened the largest inland waterway in the world to the Atlantic Ocean. The second was the announcement in 1967 that Litton Industries would open a ship building works at Erie that will construct barges and other freight hauling craft for use on the Great Lakes. This is the first new shipyard to be opened on the Great Lakes in fifty years.

Increases in port activity are expected to result from these developments, but the present size of the harbor open to vessels of seaway draft (28 feet) is limited to the eastern end. Except for the depth of Erie's harbor, it is the best protected on Lake Erie.

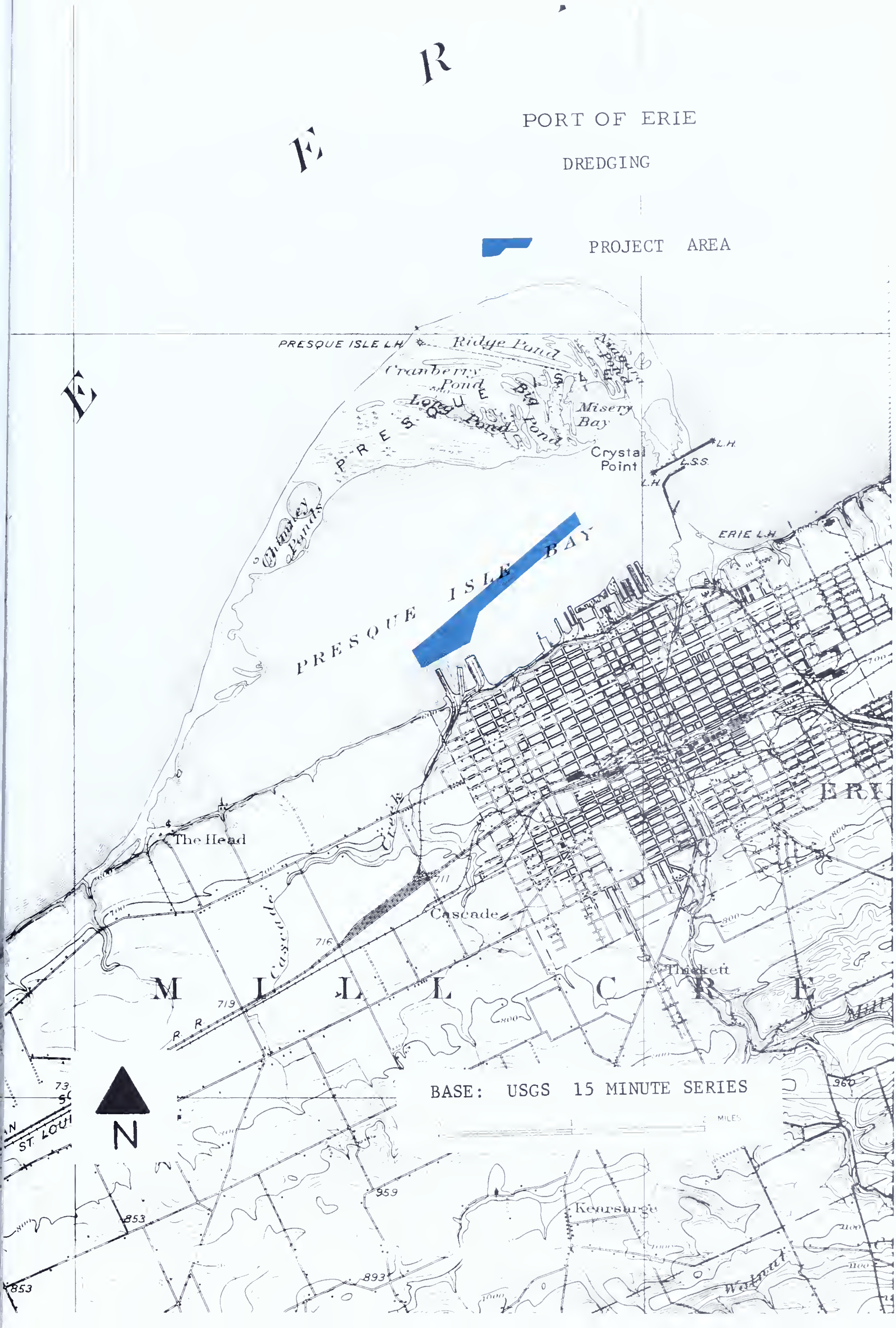
This project calls for dredging the present channel which ranges from 21 to 25 feet in depth to 28 feet to accommodate seaway going vessels and to dredge a turning basin at the interior end of the channel. Estimated cost is $2 million, with material disposal.

Economic Effects. The impact of this improvement is currently under study by consulting engineers retained by the Port of Erie Authority. However, it is known that by dredging some 8,800 feet of channel the quantity of land available for water transportation use in Erie will be doubled. (In 1967 Erie handled 50,000 tons of Seaway traffic.)

An earlier study indicated the need for dredging at least 660,000 cubic yards of material to open up this area, a number that has been revised upwards about a third.

For this project the tangible economic benefits are hardest to identify because it is needed primarily as an economic stimulus. As in the case of highway improvements deemed helpful elsewhere in Appalachia, this project is important because of the potential it can release by opening a larger portion of Erie harbor to larger vessels, thereby improving business opportunities.

The City's other transportation facilities which can feed the Port of Erie include four railroads: the Bessemer and Lake Erie; the New York Central; the Nickel Plate and the Pennsylvania; and two interstate highways -- 90 and 79 (under construction).



PORT OF ERIE

DREDGING

🟦 PROJECT AREA

BASE: USGS 15 MINUTE SERIES

K. Naturealm Conservation -- Education Area. Naturealm is a multiple-purpose concept to use part of Prince Gallitzin State Park reservoir for cultural enrichment and economic development. Like many recreation projects, it is a proposal to exploit an existing water setting and maximize the economic potential of a scenic area in a region where the economy has been depressed by losses of jobs in railroading, coal mining, steel manufacture and agriculture.

Prince Gallitzin is a 6,600-acre State park 20 miles northwest of Altoona and 35 miles north of Johnstown, both of which are Standard Metropolitan Statistical Areas. It contains the 1,760-acre Glendale Lake with boating, swimming and fishing facilities. Beside this lake a 1,500-acre site has been set aside for the $9.5 million Naturealm conservation-education development.

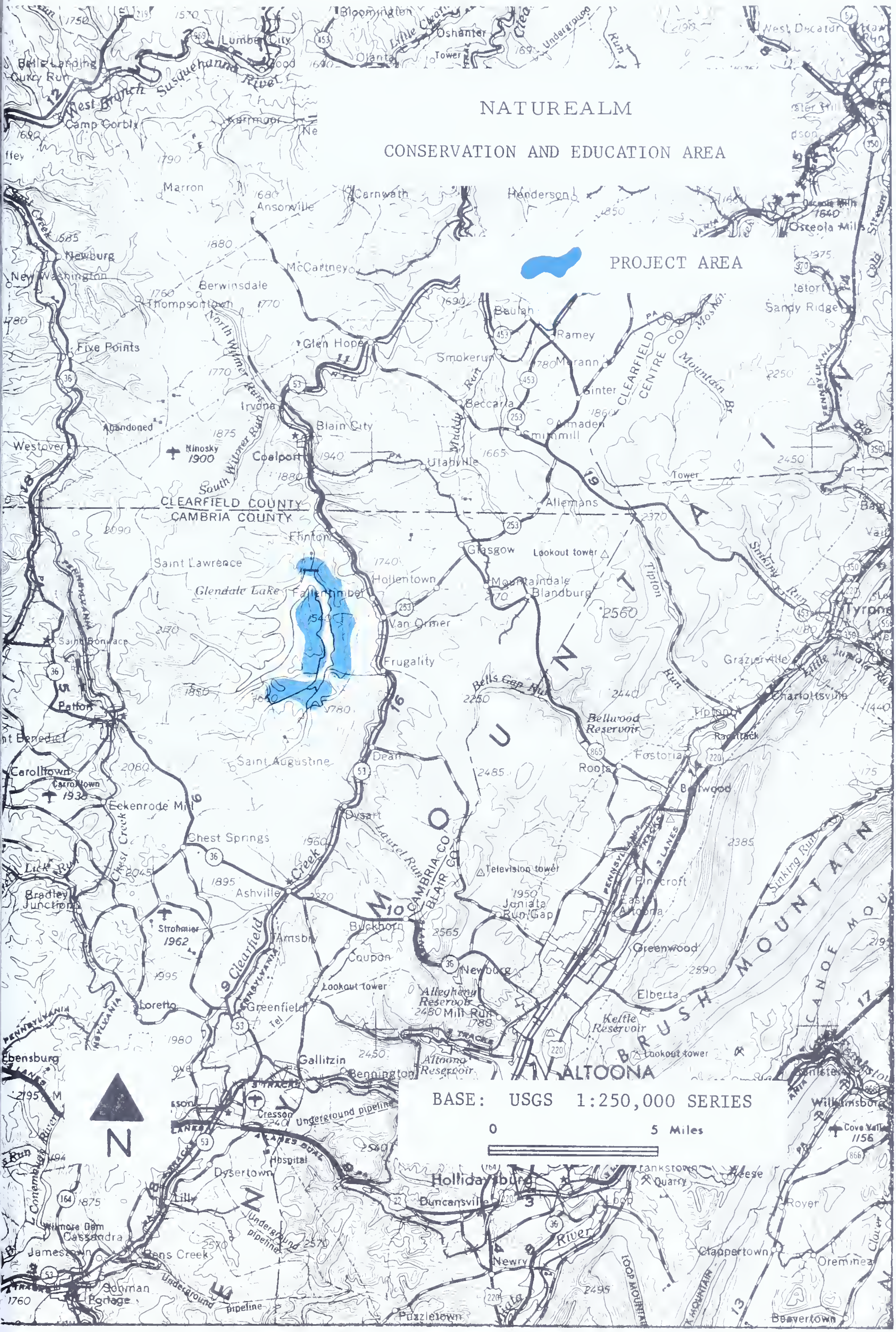
The proposal calls for an intensive use Conservation Education Area on a peninsula in the center of the park and a large Nature Preserve located along the eastern and southern boundaries. A Student Center, a Natural Science Center and supporting facilities will be located in the Conservation Education Area and be surrounded by demonstration areas showing the work of the Department of Forests and Waters (timber management, fire control, etc.), the Pennsylvania Soil Conservation Commission (plant disease control, soil erosion protection, etc.), the Pennsylvania Game Commission (feeding stations, animal observation, etc.) and the Pennsylvania Fish Commission (trout holding ponds, aquarium, etc.). Courses for students from seven to seventeen will be offered. Curricula are to be developed by the Department of Public Instruction.

Economic Effects. When completed, 438 (12-month equivalent) jobs will directly result from Naturealm and an equal number would be generated by supporting commercial activities. This will mean a $4,550,200 payroll.

An additional 1,710 jobs are expected as a result of private development that would be stimulated in motels, lodge, and winter sports areas. These jobs would, in turn, prompt an estimated 500 jobs in service enterprises, according to consultants who examined the proposal under contract to the Area Redevelopment Administration (U. S. Department of Commerce). At an average of $5,200 annually, the resulting gross payroll would exceed $11 million per year.

In sum, the economic impact is: 3,086 jobs (12-month employment equivalents); $16 million payroll; $10 million gross annual sales income plus home building and other economic stimulation.

For both Johnstown and Altoona which continue to have unemployment rates above the State average, this project would be an important economic boost.



L. Abraham's Creek Flood Protection. Abraham's Creek flows southeast through Wyoming and West Woyming (Luzerne County) to the North Branch of the Susquehanna River and has flooded these two boroughs several times in the past. Recent serious floods occurred in 1959 ($135,000 damages), 1955 ($285,000 damages) and 1946 ($416,000).

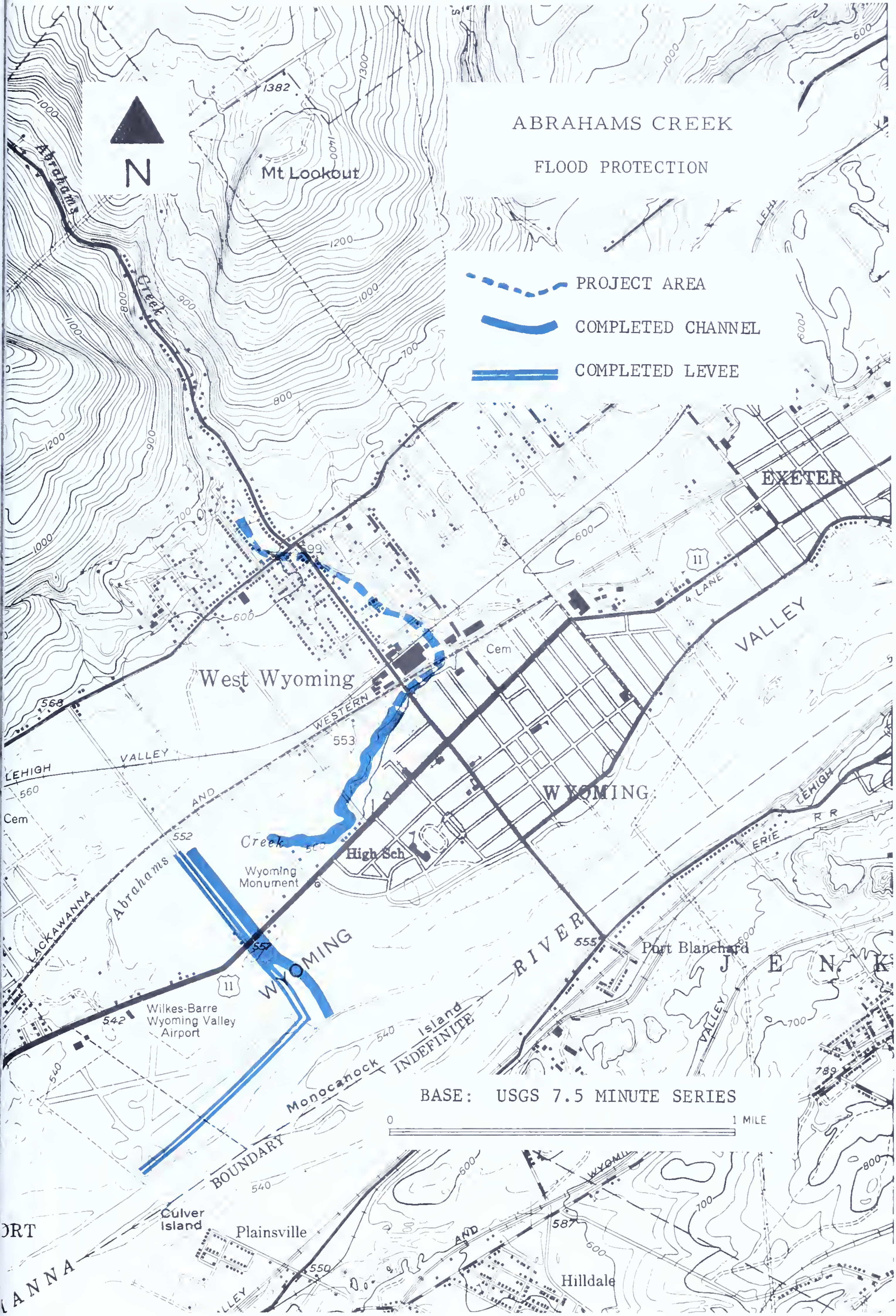
The effects of a small amount of over-topping of the creek channel are severe because of unusual geologic conditions. The creek channel cuts through a glacial deposit that is fan or cone-shaped; thus, once water pours over its banks, it drains away from the creek into homes and businesses that have been built on this alluvial deposit.

The Department of Forests and Waters has investigated the problem and found that the present channel has a capacity of 600 cubic feet per second (cfs) and that the 1946 flood discharged 4,200 cfs. Since then, Frances Slocum Dam has been built and will reduce the 1946 flood to 2,200 cfs.

This flood protection project calls for the construction of 5,000 feet of improved channel with a 2,200 cfs capacity and 800 feet of levee four feet high at a cost of $500,000.

Economic Effects. Construction of this project will protect existing homes and businesses from a recurrence of the most severe flood on record. Of the past damages 25% in Wyoming Borough and 60% in West Wyoming were sustained by industrial and commercial establishments.

The benefit cost ratio estimated by the Department of Forests and Waters is 2.12:1, a ratio which takes into account $200,000 of the construction costs for Frances Slocum Dam.


ABRAHAMS CREEK
FLOOD PROTECTION
PROJECT AREA
COMPLETED CHANNEL
COMPLETED LEVEE
BASE: USGS 7.5 MINUTE SERIES
0
1 MILE
N
Mt Lookout
Abrahams Creek
West Wyoming
WYOMING
EXETER
VALLEY
WESTERN
LEHIGH VALLEY
LACKAWANNA AND WESTERN
Cem
High Sch
Wyoming Monument
Abrahams Creek
WYOMING
RIVER
Port Blanchard
JENKINS
Wilkes-Barre Wyoming Valley Airport
Monocanock Island
INDEFINITE BOUNDARY
Culver Island
Plainsville
Hilldale
LEHIGH R R
ERIE
4 LANE
11
1382
1300
1200
1000
900
800
700
600
560
553
552
557
555
542
540
550
587
789

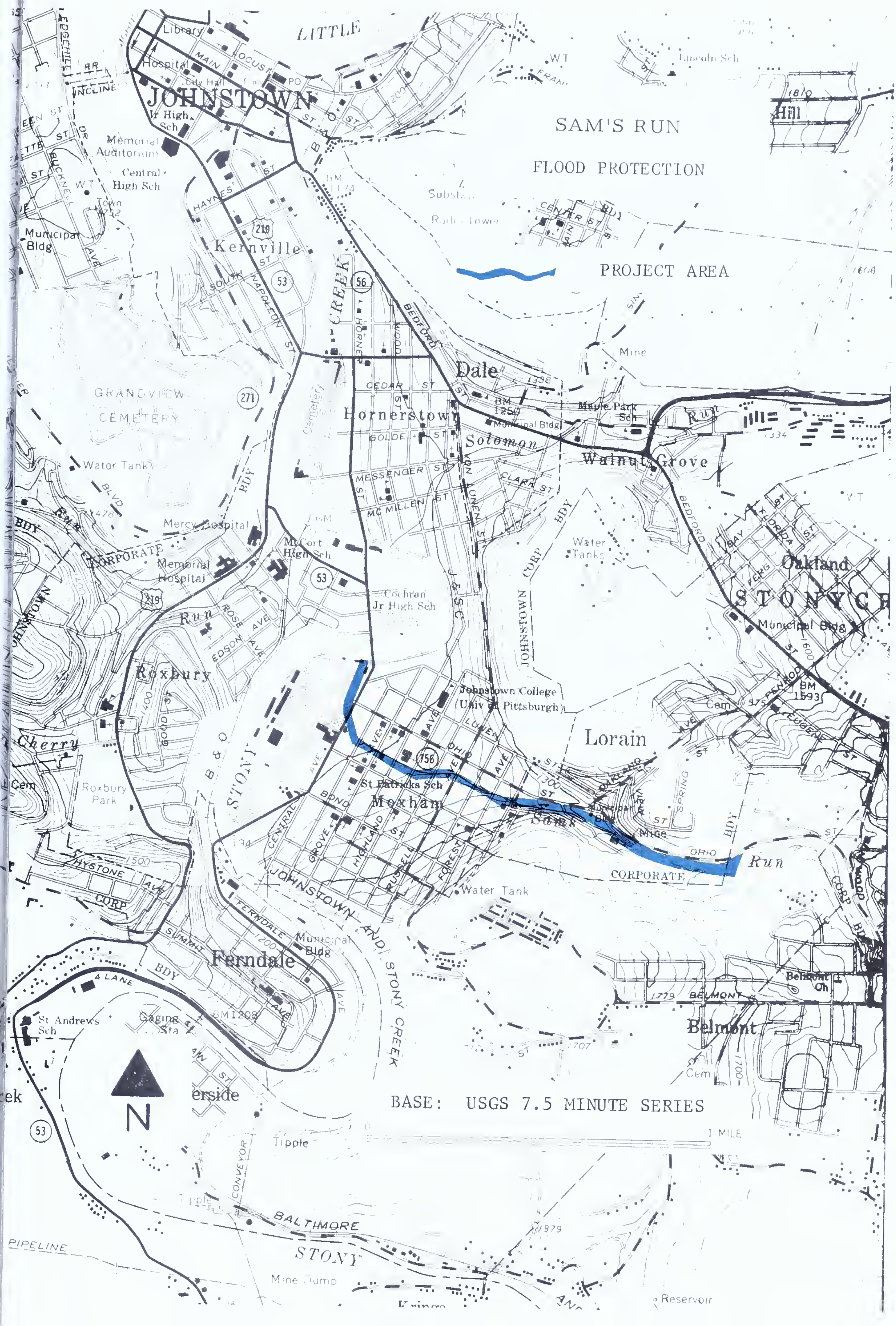
M. Sam's Run Flood Protection. Sam's Run drains through Lorain Borough and a narrow portion of the City of Johnstown (Cambria County) before joining Stony Creek, a tributary of the Conemaugh River. During the Depression the WPA built a stone channel to carry the water through the residential and commercial sections of Lorain and an industrial section of Johnstown.

Today, the channel (which is adequate for flood prevention) has deteriorated seriously and requires immediate repairs. An engineering report by the Department of Forests and Waters recommended that in addition to repairing the existing channel, the bridge opening at the mouth of the Run be enlarged, the channel be lengthened above the Borough of Lorain (to protect additional residential sections), and a settling basin be constructed at the entrance to the channel. (This settling basin would collect material that would otherwise be deposited at the mouth of the Run and constrict the channel). Estimated cost for both repair and enlargement is $320,000.

Economic Effects. It is estimated that channel repair now will cost $100,000; yet if the channel is allowed to deteriorate further and replacement becomes necessary, it will cost $1 million. (The City of Johnstown has indicated it is financially unable to make the repairs).

U. S. Steel Corporation (1,353 employees in 1965) is located near the mouth of Sam's Run and is an important source of employment to Johnstown, a Standard Metropolitan Statistical Area which suffered severe employment losses in mining and manufacturing during the 1950's.

(Among its losses was the National Radiator Company - employment 512 in 1959 -- located west of the Run at its mouth). Maintenance of Sam's Run channel is important protection to U. S. Steel Corporation.



SAM'S RUN

FLOOD PROTECTION

PROJECT AREA

BASE: USGS 7.5 MINUTE SERIES

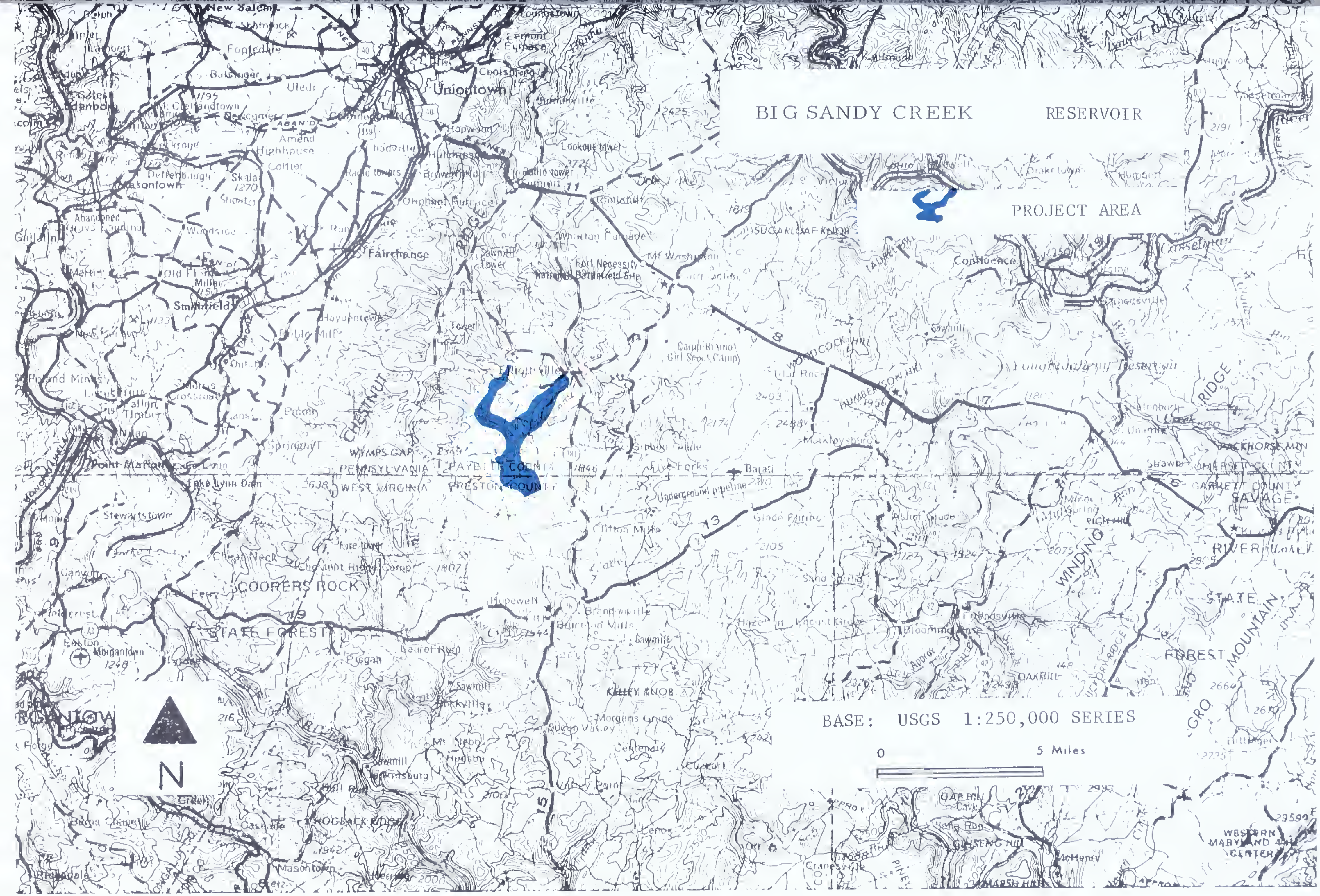
N. Big Sandy Creek Reservoir. The Big Sandy Creek Basin in southern Fayette County, Pennsylvania, and Preston County, West Virginia, is an exceptionally attractive wilderness area in which a 3,100-acre multi-purpose reservoir can be developed for recreation, flood control, water supply and water quality. This proposal by the Corps of Engineers has already been examined in light of several considerations: (1) a substantial recreation market was found to exist by a Pennsylvania State University study for the Bureau of Outdoor Recreation; (2) an economic justification analysis of the project was made by the Pennsylvania Economy League; (3) a comprehensive plan of the area around the reservoir is being prepared by a consultant to the Fayette County Planning Commission. Final location and design of project is to be coordinated between the Corps of Engineers and the Department of Forests and Waters.

The proposed 54-mile shoreline reservoir will cost an estimated $25 million, including construction of recreation facilities.

Economic Effects. The map of water impoundment needs shows that Fayette County lies in the district of Pennsylvania where the need for boating waters is greatest. For Fayette County which has suffered severe losses of mining employment, the economic importance of a recreation development is particularly important. (By 1966, unemployment in the County had dropped to 7% in contrast to the State which had declined to 3%).

The deep, narrow lake that would be formed will lie in a rugged area not suitable to industrial development, thus the reservoir will augment and in no way compete with other economic interests.

Visitor expectation is high due to the fact that 2.1 million people live within two hours driving time of the reservoir. Experience of nearby Youghiogheny Reservoir (of limited summer use because they are drawn down for low flow augmentation) shows that a daily peak of 27,000 users occurs on this reservoir. The recreation market demand in the Southern Laurel Highlands (including the Big Sandy Basin) is 600,000 vacationers, 1,400,000 weekend visitors and 2,000,000 day visitors according to the Pennsylvania State University estimates for the Bureau of Outdoor Recreation.


BIG SANDY CREEK RESERVOIR
PROJECT AREA
BASE: USGS 1:250,000 SERIES
0
5 Miles
N
Uniontown
Fairchance
Smithfield
Masontown
Point Marion
Lake Lynn Dam
PENNSYLVANIA
WEST VIRGINIA
FAYETTE COUNTY
PRESTON COUNTY
GARRETT COUNTY
WYMPS GAP
CHESTNUT
COOPERS ROCK
STATE FOREST
Morgantown
Bruceton Mills
Brandonville
Hopewell
Clifton Mills
Glade Farms
KELLEY KNOB
Confluence
Youghiogheny Reservoir
Friendsville
Markleysburg
Fort Necessity National Battlefield Site
SUGARLOAF KNOB
WOODCOCK HILL
WINDING RIDGE
SAVAGE RIVER
STATE FOREST
MOUNTAIN
Cranesville
McHenry
WESTERN MARYLAND 4-H CENTER

O. Upper Loyalhanna Creek Watershed - Flood Control, Water Supply and Recreation. The Upper Loyalhanna Creek drains a 211 square mile basin in southeastern Westmoreland County which contains 44,500 people (1960). It flows northwesterly through the communities of Rector, Ligonier, Kingston and Latrobe and is responsible for $45,300 estimated flood damages.

The watershed lies in the fastest growing county in Appalachia Pennsylvania. There is some coal mining in the area, but the stream has not been polluted by mine drainage.

This project will reduce flood damages, provide recreation facilities, impound water supplies and stimulate employment through the construction of seven structures and appurtenant facilities. (P.L. #566 Project). Its estimated cost is $7,621,400.

Economic Effects. The seven proposed structures will control 25% of the watershed and eliminate $27,200 of the estimated annual flood damages in the Basin (including 73% of the damages suffered by Ligonier Borough).

Through creation of one reservoir of 540 acres and facilities for picnicking, swimming, boating, fishing, etc., 472,400 visitor days per year will be generated. Primary recreation benefits are estimated at $567,000 annually.

Another of the proposed impoundments will provide 3,440 acre feet of municipal water supply in addition to flood prevention storage.

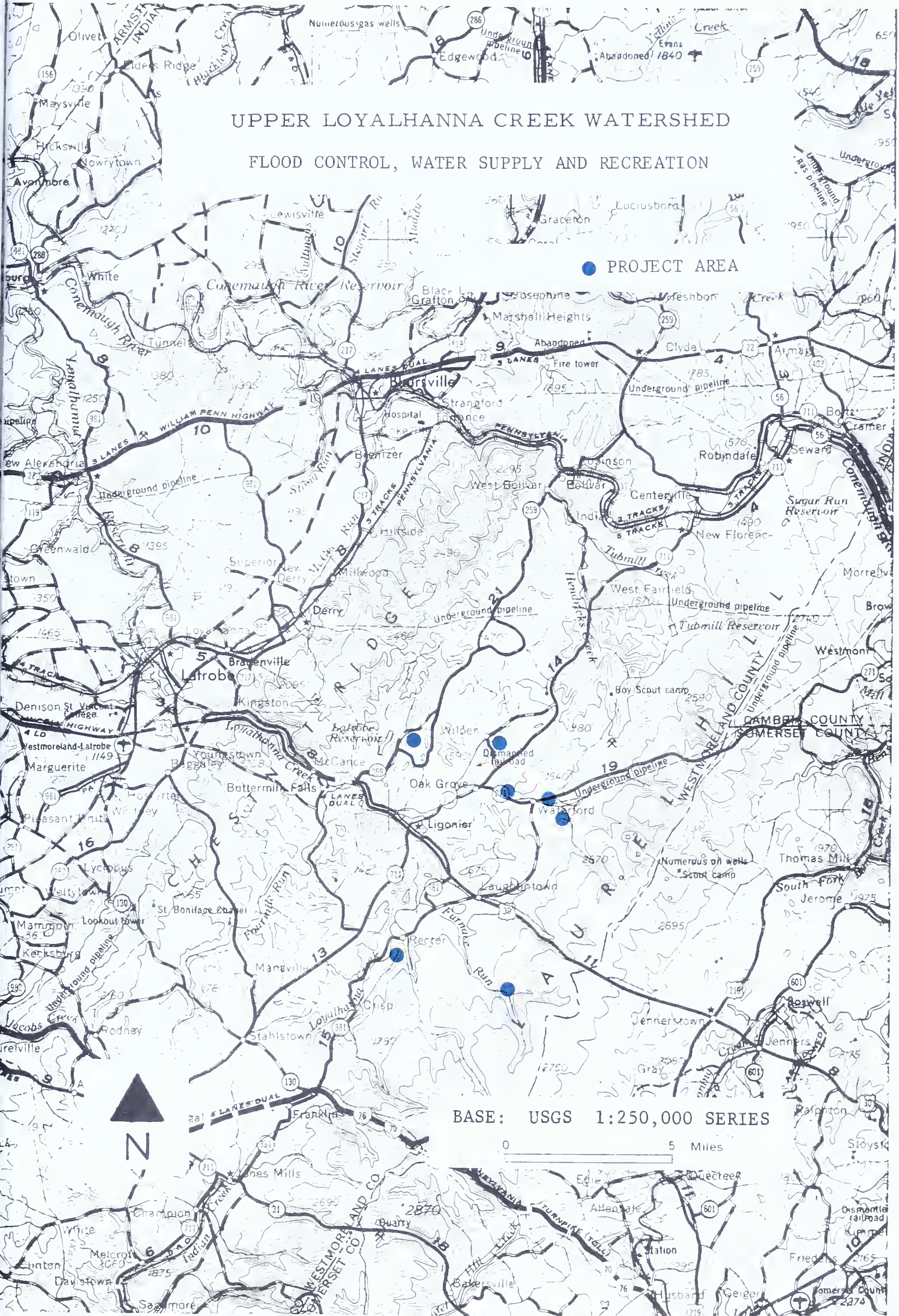
Redevelopment benefits as measured primarily in wages and salaries of employment generated (30% of construction costs and 50%

of maintenance costs) will be $55,800 annually, and secondary benefits from the project are estimated at $66,900 per year.

The ratio of average annual benefits to average annual costs (including primary and secondary benefits) is 2.1:1.

UPPER LOYALHANNA CREEK WATERSHED

FLOOD CONTROL, WATER SUPPLY AND RECREATION



P. Tioga-Hammond Reservoir and Mine Drainage Abatement. Tioga-Hammond Reservoir is in the advanced planning stage by the U. S. Army Corps of Engineers. It consists of two dams close by one another, one is to be on Crooked Creek and the other on Tioga River. They will back up two reservoirs which will be separated by a small hillside, and of the two reservoirs, Crooked Creek has much the larger capacity.

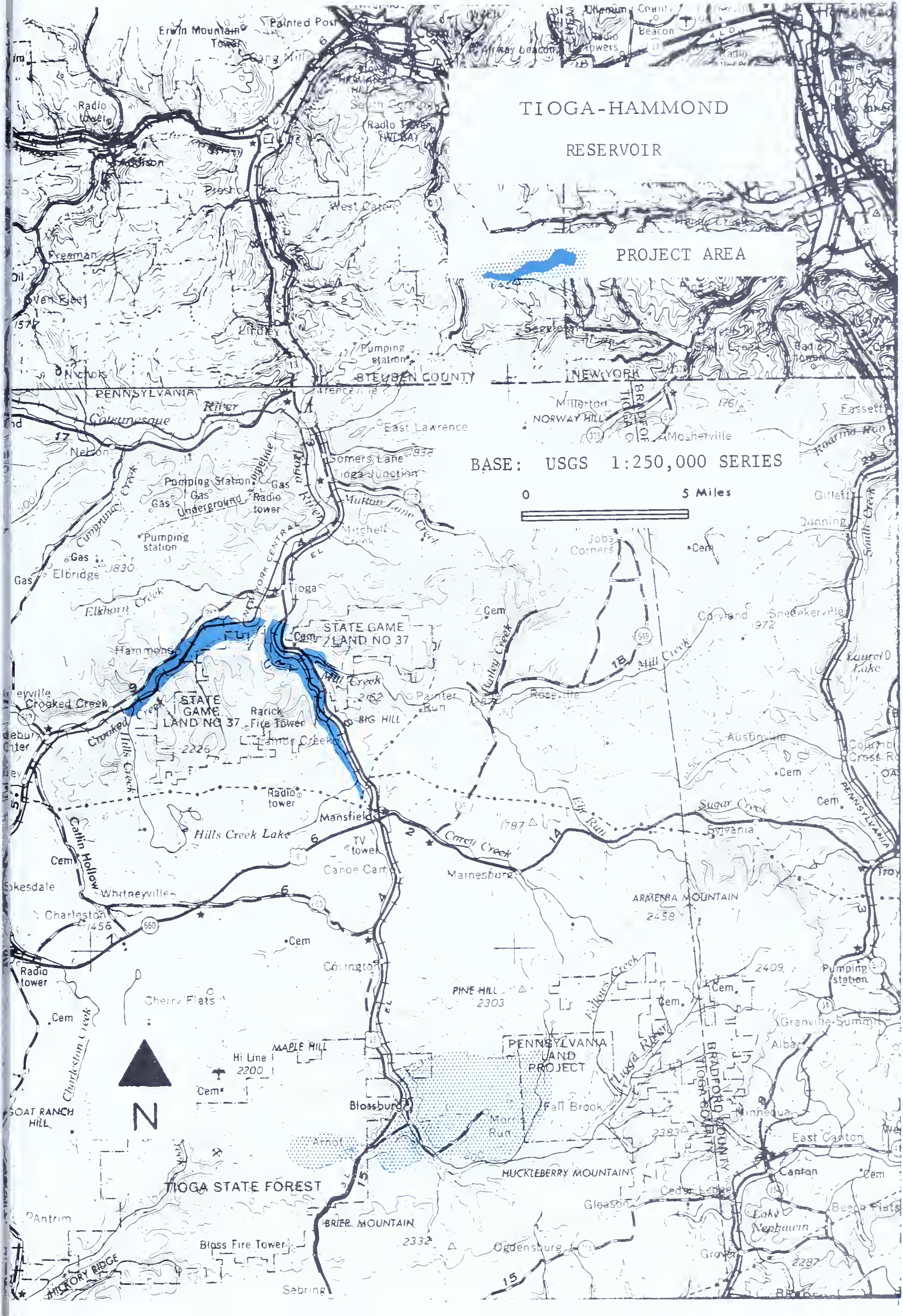
This fact is important for flood control since it is planned that excess high waters from the Tioga River will be diverted to the Crooked Creek Reservoir. Unfortunately, Tioga River is acid impregnated with an average estimated 140,000 pounds of mine acid daily. Flood waters from it will cause fish kills in Crooked Creek Reservoir and inhibit aquatic life.

The project was initiated for the flood control benefits that will result for cities in New York State. The project is included here to accelerate consideration and action and to achieve pollution abatement when the dams are constructed. Estimated cost of pollution abatement is $7.25 million.

Economic Effects. The flood benefits of this project to communities in New York State have been previously justified by the Corps of Engineers.

The recreation benefits to Pennsylvania can be manifold if pollution on the Tioga River is abated. (Because of the nature of pollution sources the 140,000 daily average of acid occasionally hits 1,000,000 pounds.) Once pollution is abated, aquatic life, waterfowl and other animal life will be enhanced, and body contact water sports will be stimulated.

The proposed reservoirs are close to two "Appalachian Corridor" highways: U. S. 15 in Pennsylvania and N. Y. 17 in New York which are expected to bring interstate visitors to the reservoirs.


TIOGA-HAMMOND
RESERVOIR
PROJECT AREA
BASE: USGS 1:250,000 SERIES
0
5 Miles
N
STEUBEN COUNTY
NEW YORK
PENNSYLVANIA
BRADFORD
TIOGA
Painted Post
Erwin Mountain Tower
Addison
Presho
West Caton
Freeman
Lindley
Pumping station
Nichols
Beacon
Radio towers
Seeley Creek
Millerton
NORWAY HILL
Mosherville
East Lawrence
Somers Lane
Tioga Junction
Fassett
Roaring Run
Nelson
Cowanesque River
Tioga River
Pumping Station
Gas
Underground Pipeline
Radio tower
Mutton Lane Creek
Mitchell Creek
Jobs Corners
Gillett
Dunning
South Creek
Camp Creek
Elbridge
Elkhorn Creek
Tioga
NEW YORK CENTRAL
STATE GAME LAND NO 37
Hammond
Crooked Creek
Mill Creek
Painter Run
BIG HILL
Bailey Creek
Roseville
Cory Creek
Snedekerville
Laurel Lake
Austinville
Columbia Cross Roads
Rarick Fire Tower
Hills Creek
Radio tower
Mansfield
Hills Creek Lake
Catlin Hollow
TV tower
Canoe Camp
Corey Creek
Mainesburg
Elk Run
Sugar Creek
Sylvania
Troy
Whitneyville
Charleston
Cem
ARMENIA MOUNTAIN
2458
Covington
Cherry Flats
Radio tower
Charleston Creek
PINE HILL
2303
MAPLE HILL
Hi Line
2200
PENNSYLVANIA LAND PROJECT
Fellows Creek
Tioga River
Pumping station
Granville Summit
Blossburg
Arnot
Morris Run
Fall Brook
Alba
Minnequa
East Canton
Canton
HUCKLEBERRY MOUNTAIN
Cedar Ledge
Gleason
TIOGA STATE FOREST
GOAT RANCH HILL
Antrim
BRIER MOUNTAIN
2332
Bloss Fire Tower
Ogdensburg
Lake Nephawin
Beech Flats
HICKORY RIDGE
Sebring

Q. Stony Creek Watershed - Flood Control and Recreation. Stony Creek Watershed covers 467 square miles in Somerset and Cambria Counties and lies between Berlin and Johnstown. Small urban areas such as Hooversville, Hollsopple and Kring have been subject to flooding in the past, as have railroads and highways.

Bituminous strip mining is common throughout the Watershed with approximately 1,000 acres of land opened annually. As a consequence of this mining activity Stony Creek and many of its tributaries are acid impregnated.

This project calls for flood control, land reclamation and recreation improvements through construction of five structures that will control 124 miles of the Watershed. (P.L. #566 Project). Estimated cost is $7,851,260.

Three of the dams will contribute to flood control and recreation; one will provide flood control and other beneficial use; and one will provide only flood control. All proposed structures are located on tributaries free from mine impregnation.

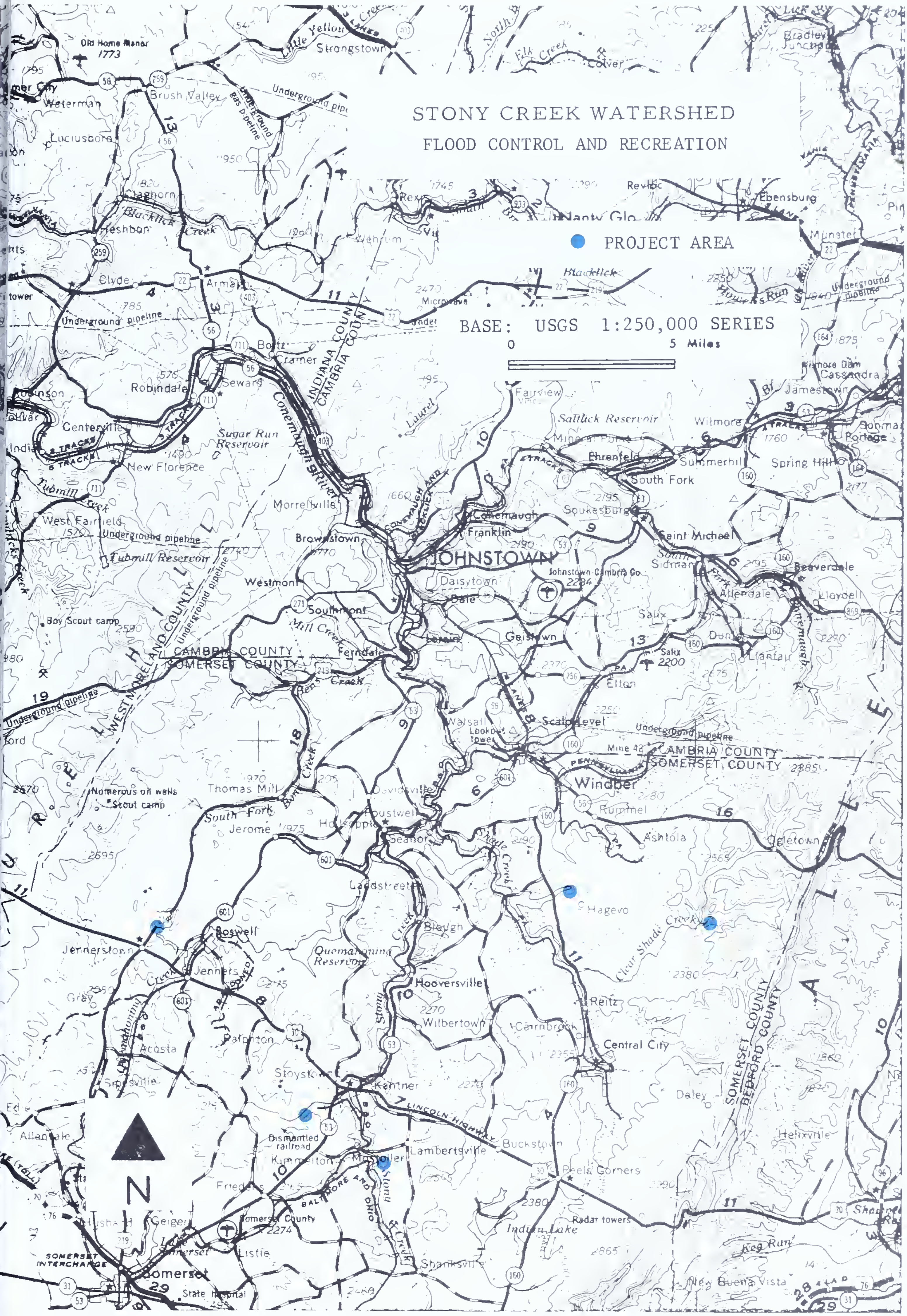
Economic Effects. Of the $257,400 annual estimated flood damages incurred in the Watershed, the project should eliminate $189,000 annually. About 200 acres will be protected by the five structures.

Recreational facilities in the Watershed are now limited; the project offers a potential of 870 acres of water surface plus surrounding facilities for boating, bathing, fishing, etc., which are expected to attract 150,000 visitors annually who will spend an estimated

$180,000. Additional business activity estimated at $108,500 should be generated in turn.

Wages and salaries to people used in construction, operation and maintenance is estimated at $123,200 annually.

As a result of the flood protection to be provided, Soil Conservation Service officials note that 1,603 jobs could result with a payroll of $15,476,500 annually. They have computed a benefit-cost ratio for the project of 2.2:1.



STONY CREEK WATERSHED

FLOOD CONTROL AND RECREATION

● PROJECT AREA

BASE: USGS 1:250,000 SERIES

0 5 Miles

CONTINUED COMPREHENSIVE WATER RESOURCES PLANNING

The need for continuing comprehensive water resources planning is apparent from the 230 projects listed in this Supplement (see Appendix G.) Many require further study and justification from both the standpoint of need and their importance to economic and social development.

At the same time, coordination of projects among communities must be a basic and continuing concern. For example, the proposed water quality criteria which may soon be adopted by the Sanitary Water Board will no longer exempt communities from dumping sewage into acid streams. As a result, basin-wide disposal systems will be needed. Conceivably plans for these systems will be made at the same time state authorities are drawing plans to curb acid pollution, creating opportunities for coordination and economy.

Whether the concern is water quality, flood control or the development of an entire watershed, the interdependence of water resources projects has been repeatedly demonstrated. States, localities and Federal agencies have joint interests in many undertakings, such as this Supplement to the work of the U. S. Army Corps of Engineers for the Appalachian Regional Commission demonstrates.

In this Supplement, the economic development factor has been a primary concern. But the projects illustrate that economic development is dependent upon a variety of other actions. State Development Plans to be prepared by the Commonwealth of Pennsylvania will similarly emphasize the economic and social importance of additional water development projects.

These plans will be consistent with the decision of the Appalachian Regional Commission which unanimously recommended that water resources planning continue after completion of the Water Resources Plan by the Corps of Engineers in 1968.

This continuing activity will proceed within the context of the State Planning Program of the State Planning Board in the annual review, revision and preparation of the Appalachian Pennsylvania State Development Plan and in the formulation of the Comprehensive State Development Plan.

APPENDIX A

QUESTIONNAIRE

REGARDING WATER RESOURCES SURVEY

FOR APPALACHIA PENNSYLVANIA

Name of Development District________________________________

Name of County__________________________

Name of person who prepared the report__________________________
Title__________________________________
Date report was prepared____________

1. To what extent do problems associated with water and related resources at present retard economic growth in the county? Do you foresee that they will in the future?

2. In what way, and to what degree, can water resources development in the county alleviate these specific problems and provide the stimulus for economic growth?

3. How have these problems affected, or how may they later affect, the county's ability to attract new industry and commerce, or discourage the expansion of existing establishments? (Cite examples and estimate the resultant loss to the economy in terms of employment and income that would otherwise have been obtained).

4. Are other resources and services in the county sufficiently developed to support economic growth so that the return on investment in water resources development will be maximized? If, for example, land were made free from flooding and developable

land opened up for industrial sites as the result of a flood control project, could other industrial requirements - such as local highway access, rail spurs, electric and gas utilities, water supply, wastes disposal, and manpower requirements -- be met? (Do not answer simply "yes" or "no." Be specific with your answer).

5. What specific water resources projects do you recommend for the county?

6. Since economic growth is in many ways related to urbanization, what urban centers would be socially and economically benefitted by water resources development projects in the county?

7. What are the relationships between each of the proposed water resources projects and other projects in the county that are planned or have been undertaken to promote economic growth?

8. If water related recreational opportunities could be provided in these proposed water resources projects, would the recreational opportunities thus provided help promote the economic growth of the county? Would they help provide the inducements to good living likely to be sought by the employees of industries which might locate in the county?

APPENDIX B*

PENNSYLVANIA STATE SUPPLEMENT TO THE CORPS OF ENGINEERS COMPREHENSIVE PLAN FOR THE DEVELOPMENT AND EFFICIENT UTILIZATION OF THE WATER AND RELATED RESOURCES OF THE APPALACHIAN REGION

1. Statement of the water resources policies, planning responsibilities, and goals.
2. Plans, problems and problem areas, present and future, by type (control of floods, regulation of rivers to enhance their value as sources of water supply for industrial and municipal development, generation of hydroelectric power, prevention of water pollution by drainage from rivers, enhancement of the recreation potentials, improvement of the rivers for navigation, conservation and efficient utilization of the land resource, soil treatment and land conservation, etc.)
3. Operational and planning principles, criteria, standards, and guidelines.
4. List of projects and their justification and priorities.

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* This questionnaire was distributed to each representative on the State Water Resources Coordinating Committee. Agencies represented on the Committee are: the Department of Agriculture, Department of Commerce, Pennsylvania Fish Commission, Department of Forests and Waters, Pennsylvania Game Commission, Department of Health, Department of Highways, Department of Internal Affairs, Department of

Mines and Mineral Industries, and the Pennsylvania State Planning Board.

APPENDIX C

STATE PARKS AND FEDERAL RECREATION AREAS

STATE PARKS

County	Existing	Proposed
Allegheny	Point	
Armstrong	Crooked Creek	Buffalo Creek (pt)
Beaver	Raccoon Creek	
Bedford	Blue Knob	
	Shawnee	
	Warriors Path	
Berks	French Creek	Blue Marsh
		Maiden Creek
Blair		Canoe Creek
Bradford		Bradford County
Bucks	Ralph Stover	Neshaminy
	Roosevelt	Nockamixon
	Washington Crossing	Tyler Estate
Butler		Buffalo Creek (pt)
		Moraine
Cambria	Prince Gallitzin	
Cameron	Sinnemahoning	
Carbon	Hickory Run	Aquashicola
		Beltsville
		Lehigh River Gorge
Centre	Black Moshannon	Blanchard
	Poe Valley	

County	Existing	Proposed
Chester	Valley Forge	Brandywine (Icedale)
		Marsh Creek
Clarion	Cook Forest	
Clearfield	Curwensville	
	Parker Dam	
	S. B. Elliott	
Clinton	Bucktail	
	Hyner Run	
	Kettle Creek	
	Ravensburg	
Crawford	Pymatuning	
Cumberland	Colonel Denning	Cumberland County
	Pine Grove Furnace	
Dauphin		Dauphin County
Delaware	Brandywine Battlefield	Delaware County
		Jeffords Estate
Elk	Bendigo	
	Elk	
Erie	Presque Isle	Elk Creek
Fayette		Ohiopyle
		Sandy Creek
Franklin	Buchanan's Birthplace	
	Caledonia	
	Mont Alto	
Fulton	Cowans Gap	

County	Existing	Proposed
Greene	Ryerson Station	
Huntingdon	Greenwood Furnace	
	Trough Creek	
	Whipple Dam	
Indiana		Conemaugh Gorge
		Yellow Creek
Jefferson	Clear Creek	
Lackawanna	Archbald Pothole	Scranton Furnaces
		Tunkhannock Creek
Lancaster	Susquehannock	
Lawrence	McConnell's Mill	
Lebanon	Memorial Lake	Swatara Gap
Lehigh		Trexler
Luzerne	Bear Creek	Francis Slocum
	Ricketts Glen	Nescopeck
		Wapwallopen
Lycoming	Little Pine	
	Susquehanna	
McKean		Kinzua Bridge
Mercer		Sandy Creek
Mifflin	Reed's Gap	
Monroe	Big Pocono	
	Gouldsboro	
	Tobyhanna	
Montgomery	Fort Washington	Evansburg

County	Existing	Proposed
Northampton		Jacobsburg
Northumberland		Sunbury Access
Perry	Big Spring	Little Buffalo Creek
Philadelphia	Independence Mall	
Pike	Promised Land	
	George W. Childs	
Potter	Denton Hill	
	Lyman Run	
	Ole Bull	
	Sizerville	
Schuylkill		Locust Lake
		Tuscarora
Snyder	Snyder-Middleworth	
Somerset	Kooser	Laurel Ridge
	Laurel Hill	
Sullivan	Worlds End	
Susquehanna		Meshoppen
Tioga	Colton Point	
	Hills Creek	
	Leonard Harrison	
Union	R. B. Winter	
	Shikellamy	
Venango		Oil Creek Gorge
Warren	Chapman	
Washington		Washington County

County	Existing	Proposed
Wayne	Prompton	
Westmoreland	Keystone	
	Laurel Mountain	
	Linn Run	
York	Gifford Pinchot	Codorus Creek
	Sam S. Lewis	

NOTE: (pt) indicates that a facility is located in more than one County.

FEDERAL RECREATION AREAS

County	Existing	Proposed (major only)
Adams	Gettysburg Battlefield National Park	
Armstrong	Crooked Creek Reservoir	
	Mahoning Creek Reservoir (pt)	
Berks	Hopewell Village National Historical Site	
Cambria	Allegheny Portage National Historical Site	
Clinton	Kettle Creek Reservoir	
Elk	East Branch Clarion River Reservoir	
Fayette	Fort Necessity National Battlefield	
Forest	Tionesta Creek Reservoir	
Huntingdon		Raystown Reservoir
Indiana	Conemaugh River Reservoir(pt)	
	Mahoning Creek Reservoir(pt)	
Luzerne	F. E. Walter Reservoir	
McKean		Allegheny River Reservoir (pt)
Monroe		Tocks Island Reservoir (pt)
Philadelphia	Independence National Historical Park	
Pike		Tocks Island Reservoir (pt)
Somerset	Youghiogheny River Reservoir	

FEDERAL RECREATION AREAS

County	Existing	Proposed (major only)
Warren		Allegheny River Reservoir (pt)
Wayne	Prompton Reservoir	
Westmoreland	Conemaugh River Reservoir (pt)	
	Loyalhanna Reservoir	

NOTE: (pt) indicates that a facility is located in more than one County.

APPENDIX D

WATER RESOURCE DEVELOPMENT PROJECTS IN APPALACHIA

(Constructed, Under Construction, Or Funds Allocated For Construction)

County	Location or Project Name	Type (1)	Agency (1)
Allegheny	Carnegie	LFP	FW
	Chartiers Creek (pt)	LFP	CE
	Tarentum	LFP	CE
	Turtle Creek	LFP	CE
	Allegheny River Locks & Dams(3)	N	CE
	Monongahela River Navigation Project - Lock and Dam	N	CE
	Ohio River Navigation Project Locks & Dams (2)	N	CE
Armstrong	Crooked Creek	R	CE
	Mahoning Creek	R	CE
	Kittanning	LFP	CE
	Allegheny River Locks & Dams(5)	N	CE
Beaver	Raccoon Park Dam	R	FW
	Darlington	LFP	FW
	Ohio River Navigation Project Lock & Dam	N	CE
Bedford	Raystown (pt)	R	CE
	Shawnee Dam	R	FW
	Everett	LFP	FW
Blair	Canoe Creek Dam	R	FW
Bradford	Athens	LFP	FW
	Sayre	LFP	FW

County	Location or Project Name	Type(1)	Agency(1)
Butler	Moraine Park Dam	R	FW
	Butler	LFP	CE
Cambria	Glendale Dam	R	FW
	Barnesboro	LFP	FW
	Johnstown	LFP	CE
	Patton	LFP	FW
	Wilmore	LFP	CE
Cameron	George B. Stevenson Dam	R	FW
	Emporium	LFP	FW
Carbon	Aquashicola (pt)	R	CE
	Beltzville	R	CE
	Francis Walter (pt)	R	CE
	Weissport	LFP	FW
	Little Schuylkill River (pt)	W	SCS
	Mauch Chunk Creek (pt)	W	SCS
Centre	Black Moshannon Dam	R	FW
	Blanchard	R	CE
	Milesburg	LFP	FW
	Philipsburg	LFP	FW
Clarion	None		
Clearfield	Curwensville	R	CE
	DuBois	LFP	CE
	Irvona	LFP	FW
Clinton	Kettle Creek	R	CE
	Lock Haven Dam	R	FW

County	Location or Project Name	Type(1)	Agency(1)
Columbia	Briar Creek (pt)	W	SCS
Crawford	Muddy Creek	R	CE
	Woodcock	R	CE
	Pymatuning Dam	R	FW
	Canadohta Lake	R	FW
	Meadville	LFP	FW
	Titusville	LFP	FW
	Little Shenango (pt)	W	SCS
	Mill Run	W	SCS
	Oil Creek	W	SCS
	Sandy Creek (pt)	W	SCS
Elk	East Branch Clarion River	R	CE
	Johnsonburg	LFP	CE
	Ridgway	LFP	CE
Erie	Union City	R	CE
	Presque Isle	LFP	CE
	Wesleyville	LFP	FW
	Elk Creek	LHI	CE
	Erie	LHI	CE
Fayette	Youghiogheny River (pt)	R	CE
	Monongahela River Navigation Locks and Dams (4)	N	CE
	Dunlap Creek	W	SCS
Forest	Tionesta	R	CE
Fulton	None		

County	Location or Project Name	Type(1)	Agency(1)
Greene	Ryerson Station Dam	R	FW
	Monongahela River Navigation Locks and Dams (2)	N	CE
	Wheeling Creek (pt)	W	FW
Huntingdon	Raystown (pt)	R	CE
	Huntingdon-Smithfield	LFP	FW
Indiana	Conemaugh River (pt)	R	CE
	Yellow Creek Dam	R	FW
	Cherry Tree	LFP	FW
Jefferson	Brockway	LFP	FW
	Big Run	LFP	CE
	Brookville	LFP	CE
	Punxsutawney	LFP	CE
	Reynoldsville	LFP	CE
	Sykesville	LFP	CE
Juniata	None		
Lackawanna	Aylesworth Creek	R	CE
	Fall Brook	R	CE
	Tunkhannock Creek Dam	R	FW
	Mayfield	LFP	FW
	Moosic	LFP	FW
	Olyphant	LFP	FW
	Scranton	LFP	CE
	Scranton	LFP	FW
Lawrence	McConnells Mill	R	FW

County	Location or Project Name	Type(1)	Agency(1)
Luzerne	Francis Walter (pt)	R	CE
	Francis Slocum Dam	R	FW
	Duryea	LFP	FW
	Kingston-Edwardsville	LFP	CE
	Mocanaqua	LFP	FW
	Plymouth	LFP	CE
	Plymouth	LFP	FW
	Swoyersville-Forty Fort	LFP	CE
	Wilkes-Barre-Hanover Twp.	LFP	CE
	Wyoming	LFP	FW
	Briar Creek (pt)	W	SCS
Lycoming	Little Pine Creek Dam	R	FW
	Williamsport	LFP	CE
McKean	Allegheny (pt)	R	CE
	Bradford	LFP	CE
	Smethport	LFP	FW
Mercer	Shenango River	R	CE
	Hogback Run	LFP	FW
	Little Shenango (pt)	W	SCS
	Sandy Creek (pt)	W	SCS
	Saul-Mathay	W	SCS
Mifflin	None		

County	Location or Project Name	Type (1)	Agency (1)
Monroe	Aquashicola (pt)	R	CE
	Tocks Island (pt)	R	CE
	Stroudsburg	LFP	FW
	Brodhead Creek (pt)	W	SCS
	Greene-Dreher (pt)	W	SCS
Montour	Danville	LFP	FW
Northumberland	Sunbury Dam (pt)	R	FW
	Milton	LFP	FW
	Sunbury	LFP	CE
Perry	Little Buffalo Creek Dam	R	FW
Pike	Tocks Island (pt)	R	CE
	Greene-Dreher (pt)	W	SCS
Potter	Galeton Fiber Dam	R	FW
	Lyman Run Dam	R	FW
	Ole Bull Run	R	FW
	Coudersport	LFP	FW
	Genesee	LFP	FW
	North Fork Cowanesque River	W	SCS
Schuylkill	Locust Creek Dam	R	FW
	Locust Lake	R	FW
	McAdoo	LFP	FW
	Little Schuylkill River (pt)	W	SCS
	Mauch Chunk Creek (pt)	W	SCS
Snyder	Sunbury Dam (pt)	R	FW
	Middle Creek	W	SCS

County	Location or Project Name	Type(1)	Agency(1)
Somerset	Youghiogheny River	R	CE
	Laurel Hill Dam	R	FW
	Boynton	LFP	FW
	Confluence	LFP	FW
	Rockwood	LFP	FW
	Windber	LFP	FW
Sullivan	None		
Susquehanna	Stillwater	R	CE
	Martin Creek	W	SCS
Tioga	Cowanesque	R	CE
	Tioga-Hammond	R	CE
	Elkland	LFP	CE
	Tioga	LFP	FW
	Marsh Creek	W	SCS
	Mill Creek	W	SCS
	North Fork Cowanesque River (pt)	W	SCS
Union	Sunbury Dam (pt)	R	FW
Venango	Oil City	LFP	CE
Warren	Allegheny (pt)	R	CE
	Warren	LFP	FW

County	Location or Project Name	Type(1)	Agency(1)
Washington	Burgettstown	LFP	CE
	Chartiers Creek (pt)	LFP	CE
	Chartiers	LFP	FW
	Granville	LFP	CE
	Washington	LFP	CE
	Slovan	LFP	CE
	Monongahela River Navigation Project Locks and Dams (3)	N	CE
	Harmon Creek	W	SCS
	Wheeling Creek (pt)	W	SCS
Wayne	General Edgar Jadwin	R	CE
	Prompton	R	CE
	Hawley	LFP	FW
	Newfoundland	LFP	FW
	White Mills	LFP	FW
	Honesdale	LFP	FW
	Greene-Dreher (pt)	W	SCS
	Lackawaxen Tributaries	W	SCS
Westmoreland	Bull Run Dam	R	FW
	Conemaugh River (pt)	R	CE
	Loyalhanna	R	CE
	Greensburg	LFP	FW
	Jeannette	LFP	FW
	Latrobe	LFP	CE
	Allegheny River Lock and Dam	N	CE
	Monongahela River Navigation Project Lock and Dam	N	CE

County	Location or Project Name	Type(1)	Agency(1)
Wyoming	None		

NOTE: (1) Type:

R	-	Reservoir
LFP	-	Local Flood Protection Project
N	-	Navigation Project
LHI	-	Local Harbor Improvement
W	-	Watershed Development Project

Agency:

CE	-	U. S. Army Corps of Engineers
FW	-	Penna. Dept. of Forests and Waters
SCS	-	U. S. Soil Conservation Service

(pt) Indicates that a facility or project is located in more than one County.

APPENDIX E

MAP TITLES AND SOURCES

Map 1: APPALACHIA DISTRICTS

Source: Pennsylvania Department of Commerce and U. S. Army Corps of Engineers.

Map 2: PHYSIOGRAPHIC AREAS

Source: "Physiographic Provinces of Pennsylvania" (Map), Topographic and Geologic Survey, Pennsylvania Department of Internal Affairs.

Map 3: MAJOR DRAINAGE BASINS

Source: "Stream Map of Pennsylvania", 1965, Pennsylvania State University.

Map 4: GENERALIZED AGRICULTURAL AND FOREST AREAS

Source: "1964 Annual Summary", C.R.S. 30, Crop Reporting Service, Pennsylvania Department of Agriculture.

Map 5: GENERALIZED MAJOR COAL, GAS AND OIL FIELDS

Source: Generalized from "Oil and Gas Fields of Pennsylvania" (Map) and "Coal Fields of Pennsylvania" (Map), Topographic and Geologic Survey, Pennsylvania Department of Internal Affairs.

Map 6: EARLY SETTLEMENT PATTERN

Source: Pennsylvania State Planning Board.

Map 7: HIGHWAYS FOR APPALACHIA

Source: "1966 Estimates of Cost for Improving Inadequate Segments of the Appalachian Highway System in the Commonwealth of Pennsylvania", Pennsylvania Department of Highways.

Map 8: PROJECTED TRAFFIC FLOW ON APPALACHIAN CORRIDORS
Average Daily Traffic - 1975

Source: "1966 Estimates of Cost for Improving Inadequate Segments of the Appalachian Highway System in the Commonwealth of Pennsylvania", Pennsylvania Department of Internal Affairs.

Map 9: ONE HOUR DRIVING DISTANCE FROM SMSA CENTRAL CITIES

Source: Pennsylvania State Planning Board.

Map 10: POPULATION DENSITY - 1960
By Minor Civil Division

Source: "The Population of Pennsylvania: A Social Profile" - 1963, Pennsylvania State Planning Board.

Map 11: MANUFACTURING EMPLOYMENT - 1965
By Minor Civil Division

Source: 1965 County Industry Reports, Bureau of Statistics, Pennsylvania Department of Internal Affairs.

Map 12: POPULATION SHIFT - 1960-1965
By Appalachian Districts

Source: U. S. Bureau of Census (1960 population) and Pennsylvania State Planning Board (1965 population estimates).

Map 13: POPULATION SHIFT - 1960-1965
By Appalachian Counties

Source: U. S. Bureau of Census (1960 population) and Pennsylvania State Planning Board (1965 population estimates).

Map 14: SMSA POPULATION PROJECTIONS - 1975

Source: "Economic and Demographic Projections for Two Hundred and Twenty-four Metropolitan Areas", Vol. III, 1967, National Planning Association, Washington, D. C.

Map 15: SMSA EMPLOYMENT PROJECTIONS - 1975

Source: "Economic and Demographic Projections for Two Hundred and Twenty-four Metropolitan Areas", Vol. I, 1967, National Planning Association, Washington, D. C.

Map 16: GENERALIZED ECONOMIC AND RECREATIONAL IMPACT AREAS

Source: Pennsylvania State Planning Board.

Map 17: PATTERN OF URBAN RECREATIONAL FLOW

Source: "Master Plan for the Pennsylvania State Park System", 1966, Fahringer, McCarty, Grey and Associates, Monroeville, Pennsylvania.

Map 18: SCHEMATIC GROWTH PATTERN

Source: Pennsylvania State Planning Board.

Map 19: MAJOR FLOOD PROBLEM AREAS IN APPALACHIA

Source: Water Resource Branch, Pennsylvania Department of Forests and Waters.

Map 20: ACID MINE DRAINAGE POLLUTION

Source: Division of Sanitary Engineering, Bureau of Environmental Health, Pennsylvania Department of Health.

Map 21: MAJOR WATER QUALITY PROBLEM AREAS
Resulting from Sewage and Biodegradable Industrial Wastes

Source: Division of Sanitary Engineering, Bureau of Environmental Health, Pennsylvania Department of Health.

Map 22: UNRECLAIMED STRIP MINING LAND - 1965

Source: Pennsylvania Department of Mines and Mineral Industries.

Map 23: WATER IMPOUNDMENT NEEDS FOR BOATING - 1980

Source: Based upon "A Report on Outdoor Recreation Demand, Supply and Needs in Appalachia", 1967, Bureau of Outdoor Recreation, U. S. Department of the Interior.

Map 24: STATE PARK ANNUAL ATTENDANCE PROJECTIONS - 1980
By State Planning Board Regions

Source: "Statewide Outdoor Recreation Plan", 1966, Pennsylvania State Planning Board.

Map 25: EXISTING AND PROPOSED PARKS AND RECREATION AREAS

Source: "Statewide Outdoor Recreation Plan", 1966, Pennsylvania State Planning Board.

Map 26: WATER RESOURCE DEVELOPMENT PROJECTS

Source: Water Resource Branch, Pennsylvania Department of Forests and Waters.

Map 27: PROPOSED WATER RESOURCE DEVELOPMENT PROJECTS

Source: Pennsylvania State Planning Board in collaboration with State agencies, Appalachia Local Development Districts and U. S. Army Corps of Engineers, U.S. Soil Conservation Service, and Port Officials.

PROJECT MAPS

Project A: LACKAWANNA RIVER - SUSQUEHANNA RIVER MINE DRAINAGE ABATEMENT

Source: Pennsylvania Department of Health

Project B: SEWICKLEY CREEK WATERSHED - FLOOD PROTECTION AND WATER SUPPLY

Source: Soil Conservation Service, U. S. Department of Agriculture and Pennsylvania Department of Agriculture.

Project C: OTOCSIN RESERVOIR AND RECREATION AREA

Source: Pennsylvania Department of Forests and Waters.

Project D: SECHLER'S RUN FLOOD PROTECTION

Source: Pennsylvania Department of Forests and Waters.

Project E: CLARION RIVER BASIN MINE DRAINAGE ABATEMENT

Source: Pennsylvania Department of Health.

Project F: CASSELMAN RIVER MINE DRAINAGE ABATEMENT

Source: Pennsylvania Department of Health.

Project G: UPPER WEST BRANCH SUSQUEHANNA RIVER MINE DRAINAGE ABATEMENT

Source: Pennsylvania Department of Health.

Project H: CONNOQUENESSING CREEK WATERSHED - FLOOD CONTROL, WATER SUPPLY AND RECREATION

Source: Soil Conservation Service, U. S. Department of Agriculture and Pennsylvania Department of Agriculture.

Project I: RACCOON CREEK RESERVOIR

Source: U. S. Army Corps of Engineers and Pennsylvania Department of Forests and Waters.

Project J: PORT OF ERIE DREDGING

Source: Port Commission, City of Erie and Pennsylvania Department of Commerce.

Project K: NATUREALM CONSERVATION - EDUCATION AREA

Source: Pennsylvania Department of Forests and Waters.

Project L: ABRAHAM'S CREEK FLOOD PROTECTION

Source: Pennsylvania Department of Forests and Waters.

Project M: SAM'S RUN FLOOD PROTECTION

Source: Pennsylvania Department of Forests and Waters.

Project N: BIG SANDY CREEK RESERVOIR

Source: U. S. Army Corps of Engineers and Pennsylvania Department of Forests and Waters.

Project O: UPPER LOYALHANNA CREEK WATERSHED - FLOOD CONTROL, WATER SUPPLY AND RECREATION

Source: Soil Conservation Service, U. S. Department of Agriculture and Pennsylvania Department of Agriculture.

Project P: TIOGA-HAMMOND RESERVOIR AND MINE DRAINAGE ABATEMENT

Source: U. S. Army Corps of Engineers and Pennsylvania Department of Health.

Project Q: STONY CREEK WATERSHED - FLOOD CONTROL AND RECREATION

Source: Soil Conservation Service, U. S. Department of Agriculture and Pennsylvania Department of Agriculture.

APPENDIX F

WATER RESOURCES DEVELOPMENT PROJECTS

Proposed by Appalachia Pennsylvania Counties, Local Development Districts, Commonwealth Agencies, Port Officials, U. S. Army Corps of Engineers, Bureau of Outdoor Recreation, and Soil Conservation Service.

Listed by Local Development Districts and County

NORTHEAST DEVELOPMENT DISTRICT - Carbon County

NAME: Abatement of acid mine drainage on Lehigh River. FUNCTION: Water Quality. EST. COST --

NAME: U.S. Corps dams in Delaware River Basin Plan - A. Beltsville; B. Aquashicola; C. Francis Walter enlargement. FUNCTION: Water Supply. EST. COST --

NAME: Water and Sewer System for Panther Valley School (extension from Lansford). FUNCTION: Water Supply, Water Quality. EST. COST --

NAME: Mauch Chunk Dam. -S.C.S.- May supply water for Industrial Park. FUNCTION: Water Supply. EST. COST --

Pike County

NAME: Study ground water supply to determine availability. FUNCTION: Water Supply, Conservation. EST. COST --

Monroe County

NAME: Modernize E. Stroudsburg Water System. FUNCTION: Water Supply. EST. COST --

NAME: Provision for more water-based recreation facilities. FUNCTION: Recreation. EST. COST --

NAME: Study of other projects on Pocono Creek and Broadhead Creek under S.C.S. program. FUNCTION: Flood Control, Recreation. EST. COST --

NAME: Construction of Impoundments on S.C.S. Upper Broadhead Creek Project. FUNCTION: Flood Control, Recreation. EST. COST --

NAME: Restoration of Tobyhanna Dam #2. FUNCTION: Flood Control, Recreation. EST. COST --

NAME: Creation of a County Municipal Authority - to build water and sewer systems, in accordance with County Plan. FUNCTION: Water Supply, Water Quality. EST. COST --

Lackawanna County

NAME: Series of County parks: @ - Mountain Mud Pond - Bell Mountain - West Mountain - Covington Lakes. FUNCTION: Recreation. EST.COST --

Luzerne County

NAME: Recommend Corps Study for development of sewage system for: Harvey's Lake; Black Mountain; Mountain Top. FUNCTION: Water Quality. EST. COST --

NAME: Water Supply for Suburban development west of Wilkes-Barre (serving Wilkes-Barre, Pittston, Nanticoke, Hazleton). FUNCTION: Water Supply. EST. COST --

NAME: Sewage Treatment Plant for Wyoming Valley Sanitation Authority. FUNCTION: Water Quality. EST. COST --

NAME: Pollution abatement on Nescopeck Creek (lower section) FUNCTION: Water Quality. EST. COST --

NAME: Wyoming; West Wyoming in Greater Wilkes-Barre Area - Local Flood protection; levee and channel improvements to alleviate flooding of industrial and commercial areas. FUNCTION: Flood Control. EST.COST: $500,000.

NAME: Abatement of sanitary sewage pollution on the Lackawanna River. FUNCTION: Water Quality. EST. COST --

NAME: Entire Wyoming Valley Flood Control to protect industry. FUNCTION: Flood Control. EST. COST --

NAME: Reservoir and recreation facility on Wapwallopen Creek (U.S. Corps) FUNCTION: Recreation. EST. COST --

NAME: Abatement of acid mine pollution on the N. Branch Susquehanna River and Lackawanna River (Scranton-Wilkes-Barre Area) - pumps, treatment works, and land reclamation. FUNCTION: Water Quality, Recreation. EST. COST - $68.2 million.

Wayne County

NAME: Modification of Prompton Reservoir. FUNCTION: Water Supply, Recreation. EST. COST --

NAME: Study of water and sewer systems @: a) Honesdale; b) Lake Ariel; c) New Foundland; e) Waymort; f) Hamlin. FUNCTION: Water Supple, Water Quality. EST. COST --

Schuylkill County

NAME: Water Tank for Industrial Park at Frackville. FUNCTION: Water Supply. EST. COST --

NAME: Water supply and waste disposal for new Industrial Parks. FUNCTION: Water Supply, Water Quality. EST. COST --

NAME: Acid Mine Drainage abatement - A. Tamaqua; B. Mahonoy City - Mahonoy Cr.; C. Shenandoah. FUNCTION: Water Qaulity, Recreation. EST. COST --

NAME: Restoration of Deer Lake Reservoir at Deer Lake Boro. FUNCTION: Water Supply, Water Quality, Recreation. EST. COST --

NAME: Tamaqua Local Protection Project (relocate Wabash Cr. channel from business district of Tamaqua). FUNCTION: Flood Control. EST. COST --

NORTHERN TIER DEVELOPMENT DISTRICT - Susquehanna County

NAME: Water supply facilities situated at: Dimock, Dundaff, S. Monntrose, Springville, Crystal Lake - needed now. Clifford, Elkdale, Montrose - needed in future. FUNCTION: Water Supply. EST. COST --

NAME: Conservation of natural resources for fish, wildlife conservation - (Salt Spring Area). FUNCTION: Conservation. EST. COST --

NAME: Water recreation - Area (Montrose vicinity. FUNCTION: Recreation. EST. COST -

NAME: Drinker Creek Project for flood control. FUNCTION: Flood Control. EST. COST --

NAME: Martin Creek Dam near Hopbottom and Clifford - near Rt. 81. FUNCTION: Flood Control. EST. COST --

NAME: Recreation impoundment and State Park, on Meshoppen Creek, S. of Springville. FUNCTION: Recreation. EST. COST --

Sullivan County

NAME: Water Supply Facility at Dushore. FUNCTION: Water Supply. EST. COST --

NAME: Erect sewage facilities at: Dushore, Laporte, Lopez, Mildred, Forksville. FUNCTION: Water Quality. EST. COST --

NAME: Flood control projects on: Muncy Creek, Hunters Lake-Muncy Valley, Spring Run, Lopez, Little Loyalsock Creek. FUNCTION: Flood Control. EST. COST --

NAME: Abatement of acid on Loyalsock between World's End State Park, and Lopez. FUNCTION: Water Quality. EST. COST --

NAME: U.S. Army Corps of Engineers project, 2,5 miles above World's End State Park. FUNCTION: Recreation. EST. COST --

NAME: Recreation ponds and lakes throughout County. FUNCTION: Recreation. EST. COST --

Tioga County

NAME: Distribution of water from Tioga - Hammond Dam to serve Blossburg to Mansfield. FUNCTION: Water Supply. EST. COST --

NAME: Reservoirs needed in future @ Red House, Buckly Hollow. FUNCTION: Water Supply. EST. COST --

NAME: Sewage treatment systems needed in future @ Blossburg, Lawrenceville, Osceola,Elkland Area. FUNCTION: Water Quality. EST. COST --

NAME: Flood control projects in: Blossburg, Lawrenceville, Wellsboro. FUNCTION: Flood Control. EST. COST --

NAME: Water Supply facilities - a) Elkland; b) Lawrenceville; c) Tioga. FUNCTION: Water Supply. EST COST --

NAME: Redwood Lake. FUNCTION: Recreation. EST. COST --

NAME: Tioga - Hammond Project - Dam and (U.S. Corps) abatement of mine drainage. FUNCTION: Flood Control, Recreation, Water Quality. EST. COST - $64,750,000 total.

Bradford County

NAME: Water Supply and sewage disposal plants presently needed at: N. Towanda, Wysox, Canton, Ulster, Bentley Creek, Gillett, Mosherville. FUNCTION: Water Supply, Water Quality. EST. COST --

NAME: Water Supply and sewage disposal plants needed at: Laceyville, Camptown, Rome, E. Smithfield, Columbia, Cross Roads, Austinville, Burlington, New Albany. FUNCTION: Water Supply, Water Quality. EST. COST --

NAME: Flood control and low·floor augmentation on: a) Wysox Creek; b) Wyalusing Creek; c) Wopposening Creek; d) South Creek. FUNCTION: Flood Control, Water Quality. EST. COST --

NAME: Sugar Creek and Bentley Creek flood control projects. FUNCTION: Flood Control. EST. COST --

NAME: Enforcement of anti-pollution laws, especially on Susquehanna River. FUNCTION: Water Quality. EST. COST --

NAME: Sewage Treatment Plant @ N. Towanda. FUNCTION: Water Quality. EST. COST --

NAME: Reservoirs throughout County. Specific sites proposed on: a) Big Tuscorora Creek; b) Skrader Creek. FUNCTION: Recreation. EST. COST --

NAME: Flood Control on Susquehanna River. FUNCTION: Flood Control. EST. COST --

Wyoming County

NAME: Flood protection Dike - on Mehoopany Creek in Foristan Twp. FUNCTION: Flood Control. EST. COST --

NAME: Future Water Supple System @ Tunkhannock. FUNCTION: Water Supply. EST. COST --

NAME: New Water Supply Systems @ a) Nicholson; b) Factoryville; c) Meshoppen. FUNCTION: Water Supply. EST COST --

NAME: Conservation of Water Supply at Mehopony Area of Charmin Factory. FUNCTION: Conservation. EST. COST --

NAME: Water Impoundment on Mehoopany Creek, Foriston Twp. FUNCTION: Flood Control. EST. COST --

NAME: State Park anywhere in County. FUNCTION: Recreation. EST. COST --

NAME: Reservoir and recreation facility on Meshoppen Creek (U.S. Corps). FUNCTION: Recreation. EST. COST --

CENTRAL SUSQUEHANNA DEVELOPMENT DISTRICT - Centre County

NAME: Mine drainage abatement on Beech Creek (N. Central Centre Co. and S. Border of Clinton Co.). FUNCTION: Water Quality. EST. COST --

NAME: Construction of Dam on Sayers Creek. FUNCTION: Water Supply, Recreation. EST. COST --

NAME: Expansion and modernization of Fish Hatchery at Bellefonte. FUNCTION: Recreation. EST. COST --

Columbia County

NAME: Pollution abatement on the Susquehanna River. FUNCTION: Water Quality. EST. COST --

NAME: Additional water supply facilities at Bloomsburg, Berwick. FUNCTION: Water Supply. EST. COST --

NAME: Flood Control projects along the Susquehanna River. FUNCTION: Flood Control. EST. COST --

NAME: Future study of the feasibility of the Green Creek potential recreation reservoir. FUNCTION: Recreation. EST. COST --

Clinton County

NAME: Abatement of sewage and acid pollution on Susquehanna River. FUNCTION: Water Quality. EST. COST --

NAME: Watershed protection of Bald Eagle Creek, below Blanchard Dam. FUNCTION: Conservation, Water Quality, Recreation, Water Supply. EST. COST --

Juniata County

NAME: Construction of a series of dams. FUNCTION: Recreation. EST. COST --

NAME: Further study of the recreation Cocolamus potential recreation reservoir site. S.C.S. 5 miles N. of Millerstown. FUNCTION: Recreation. EST. COST --

Lycoming County

NAME: Lycoming Creek Watershed demonstration project. FUNCTION: Flood Control, Water Quality, Water Supply, Recreation. EST COST --

NAME: Channel improvements on Susquehanna River. FUNCTION: Recreation. EST. COST --

Mifflin County

NAME: Construction of S.C.S. dams throughout the County. FUNCTION: Conservation. EST. COST --

NAME: Juniata River - Development of portable dams below Lewistown. FUNCTION: Recreation. EST. COST --

NAME: Construction of sewage treatment facilities above Lewistown. FUNCTION: Water Quality. EST. COST --

Montour County

NAME: Flood Control on Sechler's Run at Danville. FUNCTION: Flood Control. EST. COST - $1,150,000.

NAME: Recreation Lakes throughout the County. FUNCTION: Recreation. EST. COST --

NAME: Pollution abatement on Susquehanna River. FUNCTION: Water Quality. EST. COST --

Northumberland County

NAME: Pollution Control program on Susquehanna River. FUNCTION: Water Quality. EST. COST --

NAME: Recreation Reservoir at Montgomery Island near Milton. FUNCTION: Recreation. EST. COST --

NAME: Water Impoundment and distribution facilities. FUNCTION: Water Supply. EST. COST --

NAME: Water-oriented recreation facilities. FUNCTION: Recreation. EST. COST --

NAME: Flood Control in Northumberland County. FUNCTION: Flood Control. EST. COST --

NAME: Stream dredging and stream bank stabilization. FUNCTION: Conservation. EST. COST --

NAME: Sewage disposal facilities to reduce pollution. FUNCTION: Water Quality. EST. COST --

Perry County

NAME: Impoundments for water supply. FUNCTION: Water Supply. EST. COST --

Snyder County

NAME: Middle Creek Flood Control Project, completion of. - 5 parts. FUNCTION: Flood Control. EST. COST --

Union County

NAME: Small holding dams on feeder streams; on watershed conservation. FUNCTION: Water Supply, Conservation, Flood Control. EST COST --

NORTH CENTRAL DEVELOPMENT DISTRICT - Potter County

NAME: Build new Fish Hatchery at Oswayo. FUNCTION: Recreation. EST. COST --

NAME: Oswayo Creek Watershed (5 structures) (S.C.S.). FUNCTION: Flood Control, Recreation. EST. COST - $4,962,500.

NAME: Upper Allegheny River Watershed (7 structures) (S.C.S.) - Central and W. Central Potter and E. Central McKean. FUNCTION: Flood Control, Recreation. EST. COST - $6,362,800.

McKean County

NAME: Potato Creek Watershed (3 structures) (S.C.S.). FUNCTION: Flood Control, Recreation. EST. COST - $3,980,200.

Jefferson County

NAME: Impoundment on Trout Run. FUNCTION:

EST. COST --

NAME: Comprehensive survey of water pollution and plan for elimination. (Countywide). FUNCTION: Water Quality. EST COST --

NAME: Mahoning Creek Watershed (3 structures) S.C.S. FUNCTION: Flood Control, Recreation. EST COST - $5,005,000.

NAME: North Fork Reservoir (N. Central Jefferson Co. - N. Fork of Red Bank Creek) (U.S. Corps). FUNCTION: Flood Control, Water Supply, Water Quality. EST COST --

NAME: Little Sandy Creek Reservoir (S.W. Jefferson Co.) U.S. Corps. FUNCTION: Flood Control, Water Supply, Water Quality. EST. COST --

Elk County

NAME: Development of a major surface supply of water for St. Marys Area. (Urban and Industrial water supply and recreation). FUNCTION: Water Supply, Recreation. EST. COST --

NAME: W. Branch Clarion River Watershed. (4 structures)-also affects McKean Co. S.C.S. FUNCTION: Water Supply, Flood Control, Recreation. EST. COST - $4,751,200.

Clearfield County

NAME: Sandy Lick Creek Watershed. Multi-purpose project in N.W. Clearfield Co., and over into Jefferson Co. S.C.S. FUNCTION: Flood Control, Water Supply, Recreation. EST. COST - $5,602,100.

NAME: Federal aid to participate in reservoir construction at Otocsin. (Anderson Creek in North Fork). FUNCTION: Recreation. EST. COST - $29 million (total).

NAME: Pollution abatement on Upper W. Branch of Susquehanna River and its tributaries above Curwensville Reservoir - Anderson Cr., Bear Run, and Upper W. Branch Susquehanna. FUNCTION: Water Quality. EST. COST - $7.7 million.

Forest County

NAME: Allegheny Forest Development (dams on small streams). FUNCTION: Recreation. EST COST --

NORTHWEST DEVELOPMENT DISTRICT - Warren County

NAME: Sewage facilities for communities of Sugar Grove, Clarendon, Tidioute. FUNCTION: Water Quality. EST. COST --

NAME: Raise Allegheny National Forest Development from $½ million to $1 million as originally planned. (Perhaps related to Forest Co. project. FUNCTION: Recreation. EST. COST --

NAME: Tionesta Creek Watershed (S.E. Warren Co., N.E. Forest Co., and S.W. McKean Co.) - Entire project is in Allegheny National Forest; 10 miles from Warren. (5 structures). FUNCTION: Flood Control, Recreation. EST. COST - $3,979,600.

NAME: Brokenstraw Creek Watershed (6 structures) N.W. Warren Co. - S.C.S. FUNCTION: Flood Control, Recreation. EST. COST - $5,787,700.

NAME: Brokenstraw Creek Reservoir (U.S. Corps). FUNCTION: Flood Control, Water Quality, Water Supply. EST. COST --

Clarion County

NAME: Acid-mine drainage abatement in Clarion River Basin. (Treatment plants and surface restoration). FUNCTION: Water Quality, Water Supply, Recreation. EST. COST - $60 million.

NAME: Clarion River Reservoir - Lower reaches of Clarion River at St. Petersburg (U.S. Corps). FUNCTION: Flood Control, Water Qaulity, Water Supply, Recreation. EST. COST - $201 million.

NAME: Study of underground water supply. FUNCTION: Water Supply. EST. COST --

Crawford County

NAME: Expansion and modernization of Fish Hatchery @ Linesville. FUNCTION: Recreation. EST COST --

NAME: Sugar Creek Watershed (2 structures) - S.E. Crawford and N.W. Venango. S.C.S. FUNCTION: Flood Control, Recreation. EST. COST - $7,583,100.

NAME: Flood Plains Study in Meadville Area. (by Corps of Engineers) FUNCTION: Flood Control. EST. COST --

NAME: Lake Cussewago - N.W. of Meadville. FUNCTION: Flood Control, Recreation. EST. COST --

Lawrence County

NAME: Detailed study of impoundments in abandoned strip mines. FUNCTION: Recreation. EST COST --

NAME: Maintain and enhance Neshannock Creek for excellent trout fishing. FUNCTION: Recreation, Conservation. EST. COST --

NAME: Flood Control projects @ Shenango River, Neshannock Creek, Connoquenessing Creek and Slippery Rock Creek. FUNCTION: Flood Control. EST.COST --

NAME: Initiate interstate pollution abatement program on Mahoning River. (S.W. Lawrence Co., and Ohio). FUNCTION: Water Quality. EST. COST --

Mercer County

NAME: Eliminate flood hazards on Neshannock Creek (reduce flooding in local New Castle). FUNCTION: Flood Control. EST. COST --

NAME: Accelerated development of recreation areas around Shenango River Reservoir. FUNCTION: Recreation. EST. COST --

NAME: Provide surface water storage for Industrial use. (At intersection of I-80 and 18-S. of Farrell). FUNCTION: Water Supply. EST. COST --

NAME: Eliminate pollution on W. Branch of Wolf Creek (North of Grove City). FUNCTION: Water Quality. EST. COST --

NAME: Wolf Creek Project (S.C.S.) for water supply North of Grove City. FUNCTION: Water Supply. EST. COST --

NAME: Develop Impoundments near Interstate system-particularly: Sandy Lake, Stoneboro, Mercer, London, and Grove City Areas. FUNCTION: Water Supply. EST. COST --

NAME: Dredging of Shenango River - below Sharon-Farrell Area. FUNCTION: Flood Control. EST. COST --

NAME: Pollution abatement on Shenango River below Sharon. FUNCTION: Water Quality. EST. COST --

Venango County

NAME: Construction of multi-purpose dam on Two Mile Run. FUNCTION: Recreation. EST. COST --

NAME: Canalization of Allegheny River. FUNCTION: Recreation. EST. COST --

NAME: Pollution abatement on watersheds in S. part of County and watershed restoration on: Scrubgrass Creek, S. Sandy Cr., E. Sandy Cr. and Wolf Run. FUNCTION: Water Quality. EST. COST --

Erie County

NAME: Erie Port Improvements (Erie Port Commission) FUNCTION: Port Improvements. EST. COST - $5,878,000 (total).

NAME: LeBoeuf Creek Watershed - 10 miles from Erie (S.C.S. FUNCTION: Recreation, Flood Control, Water Supply. EST. COST - $4,188,000.

NAME: Upper French Creek Watershed (3 structures) - 20 miles from Erie- only small port in Pennsylvania, mostly in N.Y.- S.C.S. FUNCTION: Water Supply, Flood Control, Recreation. EST. COST - $8,099,300.

NAME: Development of two (2) small boat harbors on Lake Erie. FUNCTION: Recreation. EST. COST --

TURNPIKE DEVELOPMENT DISTRICT - Somerset County

NAME: Flood Control Project (Meyersdale Boro). FUNCTION: Flood Control EST. COST --

NAME: Construction of 2 million gal. reservoir, main lines, service lines, storage tank water treatment facilities. - (Paint Twp.) FUNCTION: Water Supply. EST. COST --

NAME: Building additional reservoir capacity, renewing and extending service lines, installation of water treatment facilities.-(Sipesville-Lincoln Twp.) FUNCTION: Water Supply. EST. COST --

NAME: Purchase of additional watershed acreage (Myersdale Boro).
FUNCTION: Water Supply. EST. COST --

NAME: Construction of water storage tank and remodeling of water treatment facilities - (Jenners Twp.). FUNCTION: Water Supply. EST. COST --

NAME: Construction of additional reservoir capacity and extension of service lines - Jennerstown Boro. and installation of treatment plant. FUNCTION: Water Supply. EST. COST --

NAME: Extension and remodeling of supply lines - Somerset Boro.
FUNCTION: Water Supply. EST. COST --

NAME: Extension and remodeling of supply lines to out-lyingareas - Conemaugh Twp. FUNCTION: Water Supply. EST. COST --

NAME: Wills Creek Watershed. E. Somerset and S.W. Bedford Counties. (S.C.S.) FUNCTION: Flood Control, Water Supply, Water Quality. EST. COST --

NAME: Upper Casselman River Reservoir - In S. Central Somerset Co. (U.S.Corps) FUNCTION: Flood Control, Water Quality, Water Supply. EST. COST --

NAME: Laurel Hill Creek Dam Site - Laurel Hill Creek N. of Youghiogheny Reservoir - U.S. Corps. FUNCTION: Flood Control, Water Quality, Water Supply. EST. COST --

NAME: Clear Shade Creek Reservoir - on Clear Shade Creek N.E. Somerset Co. U.S. Corps. FUNCTION: Flood Control, Water Quality, Water Supply. EST. COST --

NAME: Upper Stony Creek Reservoir-Upper Stony Creek above Quemahoning Reservoir. (U.S. Corps). FUNCTION: Flood Control, Water Quality, Water Supply. EST. COST --

NAME: Additional funds for mine drainage abatement work on Casselman River. (Pa. Dept. of Health Project) FUNCTION: Water Quality. EST. COST - $5-7 million.

Cambria County

NAME: Sam's Run - at Johnstown. Repair and extension of channel improvements; protect residential and industrial areas. FUNCTION: Flood Control. EST.COST - $320,000

NAME: Elimination of stream pollution - tributaries of: W. Branch of Susquehanna, Clearfield Cr., Blacklick Cr., Conemaugh River, Little Conemaugh Cr., Stony Creek R., i.e. all major streams of County. FUNCTION: Water Quality. EST. COST --

NAME: Naturealm - in Prince Gallitzin State Park. FUNCTION: Conservation. EST. COST - $9.5 million.

NAME: Collapsible dam on Conemaugh and Stony Creek Rivers @ Johnstown. FUNCTION: Recreation. EST. COST --

Huntingdon County

NAME: Sediment control-Standing Stone Creek, Shavers Creek and Augwick Creek Watersheds. FUNCTION: Water Quality. EST. COST --

NAME: Channel improvement on Augwick Creek - near Mt. Union Airport along U.S. 522. FUNCTION: Flood Control. EST. COST --

NAME: Flood protection project - Huntingdon and Smithville Twps. FUNCTION: Flood Control. EST. COST --

NAME: Provision of treatment facilities by municipalities presently discharging waste water. @ Alexandria, Petersburg, Mapleton, Orbisonia, and Huntingdon, Mt. Union. FUNCTION: Water Quality. EST. COST --

NAME: Provision of treatment facilities by industries presently discharging waste water. W. Virginia Pulp and Paper Co. (Tyrone (Blair County) and Williamsburg), B.D.M. Bare Paper Co., Roaring Springs (Blair Co.). FUNCTION: Water Quality. EST. COST --

NAME: Trough Creek Reservoir - on Trough Creek (S.W. Huntingdon Co.) FUNCTION: Water Quality, Recreation. EST. COST --

NAME: Huntingdon Reservoir on Standing Stone Creek. FUNCTION: Flood Control, Water Supply, Recreation, Water Quality. EST. COST --

NAME: Petersburg Reservoir on Shaver Creek - N. Central Huntingdon Co. FUNCTION: Flood Control, Water Supply, Recreation. EST. COST --

NAME: Orbisonia Reservoir on Augwick Creek-S. Huntingdon Co. FUNCTION: Flood Control, Water Supply, Recreation. EST. COST --

NAME: Completion of Raystown Reservoir. U.S. Corps. FUNCTION: Flood Control, Water Quality. EST COST --

Bedford County

NAME: Water supply in potential growth area. (Shakesspring Twp. between Bedford and Everett). FUNCTION: Water Supply. EST. COST --

NAME: Extension of water lines to serve new areas - incl. industrial park. (Bedford Interchange area). FUNCTION: Water Supply. EST. COST --

NAME: Well drilling - Breezewood. FUNCTION: Water Supply. EST. COST --

NAME: S.C.S. feasibility study for flood control-Dunnings Creek Watershed. FUNCTION: Flood Control, Recreation, Conservation. EST. COST --

NAME: Clear Ridge Dam and 1500 acre Lake-Shavers Creek near Breezewood. FUNCTION: Recreation, Water. EST COST --

Blair County

NAME: Sanitary sewerage and sewage treatment throughout County in built-up areas. FUNCTION: Water Quality. EST. COST --

NAME: Dam on Canoe Creek. FUNCTION: Flood Control, Recreation. EST. COST --

NAME: Dredging and Stream clearance (throughout the County. FUNCTION: Flood Control, Water Quality. EST. COST --

NAME: Flood protection facilities @ Tyrone. FUNCTION: Flood Control. EST. COST --

NAME: Additional water supply and water quality control facilities @ Altoona City, Bellwood Boro, Tyrone Boro, Newry Boro. FUNCTION: Water Supply, Water Quality. EST. COST --

NAME: Flood Control Dam - Catfish area of Frankstown Branch. FUNCTION: Flood Control, Recreation. EST. COST --

Fulton County

NAME: Treatment plant to replace on-lot disposal facilities @: Neidmore, Crystal Spring, and Warfordsburg. FUNCTION: Water Quality. EST. COST --

NAME: Sewage disposal facility at McConnellsburg on Big Cove Creek. FUNCTION: Water Qaulity. EST. COST --

NAME: Construction of low-flow augmentation reservoirs along major tributaries and headwater areas. FUNCTION: Water Supply, Water Quality. EST. COST --

Somerset County

NAME: Stony Creek Watershed, N. Somerset Co., and S. end of Cambria Co. 5 structures - S.C.S. FUNCTION: Flood Control, Recreation. EST. COST - $7,851.260.

SOUTHWESTERN DEVELOPMENT DISTRICT - Westmoreland County

NAME: Study of river depths and underwater problems affecting water recreational demand (Rostraver Twp.). FUNCTION: Recreation. EST. COST --

NAME: Investigation of methods needed to reduce acid-mine drainage in Loyalhanna Reservoir, and reconsideration of providing recreation facilities at reservoir. FUNCTION: Water Quality, Recreation. EST. COST --

NAME: Sewickley Creek Watershed, S.C.S. (2 structures)-retarding structures and channel improvement - on I#70-. FUNCTION: Flood Control, Water Supply. EST. COST - $3,528,800.

NAME: Turtle Creek Watershed-S.C.S. (4 structures)-between Jeannette in Westmoreland, and Braddock in Allegheny County. FUNCTION: Flood Control, Water Supply, Recreation. EST. COST - $3,594,000.

NAME: Upper Loyalhanna Creek Watershed. S.C.S. (7 structures)-50 miles from Pittsburgh, 12 miles from Greensburg. In Ligonier-Latrobe Area. FUNCTION: Flood Control, Water Supply, Recreation. EST. COST - $7,621,400.

NAME: Tubhill Creek Reservoir (U.S.Corps)-W. of Johnstown, above Conemaugh Reservoir. FUNCTION: Flood Control, Water Quality, Water Supply. EST. COST --

Washington County

NAME: Development of a site for a marina at confluence of E. Pike Run and Monongahela River, (E. Washington Co.-across from California, Pa. FUNCTION: Recreation. EST. COST --

NAME: Impoondment on Plum Run. FUNCTION: Recreation. EST. COST --

NAME: Impoundment on Buffalo Creek (W. central Washington County. FUNCTION: recreation. EST. COST --

NAME: Investigation of water supply problems on Pigeon Creek and Little Chartiers Creek Basins. FUNCTION: Water Supply. EST. COST --

NAME: Increase water storage capacity of Racoon Creek Basin. (N.W. Washington Co.) FUNCTION: Water Supply. EST. COST --

NAME: Develop new methods of laying oil and gas pipe lines - study with recommendations. FUNCTION: Recreation. EST. COST --

NAME: Conduct feasibility study on Ten-Mile Creek Watershed (S. Washington Co.). FUNCTION: Water Supply, Recreation. EST. COST --

NAME: Initiate flood control project in Catfish Creek-(unable to identify location). FUNCTION: Flood Control. EST. COST --

NAME: Conduct flood plain studies of Chartiers, Pigeon and Racoon Creeks, and of Monongahela River. FUNCTION: Flood Control. EST. COST --

NAME: Rechannel Pigeon Cr. to permit its flood plain to be used for industrial purposes. (E. Washington Co.-Flows into Monongahela River). FUNCTION: Flood Control. EST. COST --

NAME: Water Impoundment on Cross Creek (Western Washington Co-near town of Cross Creek). FUNCTION: Water Supply, Flood Control, Recreation. EST. COST --

NAME: Multi-purpose impoundment on Ten-Mile Creek. (S.E. Washington Co.). FUNCTION: Flood Control, Water Supply, Recreation. EST. COST --

NAME: Conduct research into feasibility of collecting treated discharges from coal mines for general use. FUNCTION: EST. COST --

NAME: Research project to test feasibility of developing dams and reservoirs over mined-out areas. FUNCTION: Water Quality, Recreation. EST. COST --

NAME: Initiate flood control project on Chartiers Creek (Between Washington and Canton Twps., Canonsburg and Houston). FUNCTION: Flood Control. EST. COST --

NAME: Construction of Stonewall Jackson and Rowlsburg Reservoirs (authorized) in West Virginia and 23 smaller reservoirs on various tributaries to the Monongahela River. (U.S. Corps). FUNCTION: Flood Control. EST. COST --

NAME: Racoon Creek Watershed (S. Beaver and N. Washington) - S.C.S. FUNCTION: Flood Control, Recreation, Water Supply. EST. COST - $1,921,800.

NAME: Racoon Creek Reservoir (S. Beaver and N. Washington Co's) (U.S. Corps). FUNCTION: Flood Control, Water Quality, Water Supply, Recreation. EST. COST - $35 million est. includes acid stream abatement & strip mine reclamation.

NAME: Impoundment on Brush Creek. FUNCTION: Recreation, Flood Control. EST. COST --

Allegheny County

NAME: Chartiers Creek stream improvement (channelization) between Windgap road and Scully Yard Bridge. FUNCTION: Flood Control. EST. COST --

NAME: Investigation of recreation potential of developing Islands in Ohio, Allegheny Rivers. - Brunot, Six-Mile, Twelve-Mile, Nine-Mile, Jakcs, and Sycamore Islands. FUNCTION: Recreation. EST. COST --

NAME: Deer Creek Park and Reservoir. (Confluence of Deer Creek and Allegheny River - at Harmarville, near Oakmont). FUNCTION: Recreation. EST. COST --

NAME: Port Studies (Allegheny Co. Port Authority) FUNCTION: Port Improvements. EST. COST - $115,800.

Indiana County

NAME: Dam on South Branch of Plum Creek. (W. Central Indiana County). FUNCTION: Recreation, Flood Control, Water Supply. EST. COST --

NAME: Blacklick Creek Watershed. (E. Central Indiana and W. Central Cambria) Indiana is in the watershed. FUNCTION: Flood Control, Recreation. EST. COST - $5,085,700.

NAME: Increased use of Mahoning Dam (in N.W. Indiana and E. Central Armstrong). FUNCTION: Recreation. EST. COST --

NAME: Additional recreation facilities at Conemaugh Reservoir. FUNCTION: Recreation. EST. COST --

NAME: Investigation to determine acid-mine drainage source and to upgrade water quality on Conemaugh Reservoir. FUNCTION: Water Quality. EST. COST --

Fayette County

NAME: Indian Creek Watershed - 3 structures. (E. Fayette Co. and S.E. Westmoreland Co.) - S.C.S. FUNCTION: Flood Control, Water Supply, Recreation. EST. COST - $4,600,600.

NAME: Jacob's Creek Project. FUNCTION: Recreation, Flood Control. EST. COST --

NAME: Big Sandy Creek Reservoir - S. Fayette Co. (N. Wharton Twp.). Extends into West Virginia. (U.S.Corps). FUNCTION: Flood Control, Water Quality, Water Supply, Recreation. EST. COST - $25 million, inc. Rec. facilities.

Greene County

NAME: Dunkard Creek Reservoir - Tributary to Monongahela River (S.E. Greene Co.) (U.S.Corps) FUNCTION: Flood Control, Water Quality, Water Supply. EST. COST --

Butler County

NAME: Impoundment on Buffalo Creek (S.E. Butler Co.) FUNCTION: Recreation. EST. COST --

NAME: S. Branch Bear Creek Flood Protection Study. (in vicinity of Petrolia). FUNCTION: Flood Control. EST. COST --

NAME: Shank Run flood protection study (City of Butler). FUNCTION: Flood Control. EST. COST --

NAME: Connoquenessing Creek Watershed (S.W. Butler Co.) incl. towns of Butler and Zelienople. S.C.S. FUNCTION: Flood Control, Water Supply, Recreation. EST. COST - $14,637,300.

NAME: Little Connoquenessing Creek Dam Site (W. of Butler) U.S. Corps. FUNCTION: Flood Control, Water Quality, Water Supply. EST. COST --

NAME: Glade Run Reservoir - S.W. Butler County. (U.S. Corps). FUNCTION: Flood Control, Water Quality, Water Supply. EST. COST --

NAME: Impoundments for: Carnahan, Rattling Run, Roaring Run, Apollo, N. Apollo, Leechburg, Big Run. FUNCTION: Water Supply. EST. COST --

NAME: Impoundment of S. Branch of Pine Creek for: Atwood, Dayton, Elderton, Rural Valley. FUNCTION: Water Supply. EST. COST --

NAME: Impoundment of Patterson Creek for Worthington Boro & Mushroom Factory. FUNCTION: Water Supply. EST. COST --

NAME: Investigation of acid mine drainage & measures & to upgrade quality on Crooked Creek Reservoir & Mahoning Reservoir. FUNCTION: Water Quality, Recreation. EST. COST --

NAME: Channelization of Allegheny River-Brady's Bend to Pt. below Parker. FUNCTION: Flood Control. EST. COST --

U.S. CORPS OF ENGINEERS - Region B

NAME: Allocation of Appalachia Funds to S.C.S. to study streambank stabilization problems and carry out necessary construction measures in N.E. portion of Corps Region B. FUNCTION: Conservation. EST. COST --

U.S. CORPS OF ENGINEERS - Region F

NAME: Appalachian funds made available for studies of abandoned oil and gas well contamination. FUNCTION: Water Quality. EST. COST --

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